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THE CHANGE IN MINI-NUTRITIONAL ASSESSMENT (MNA) SCORES ON ADMISSION AND DISCHARGE FROM AN ASIAN COMMUNITY HOSPITAL

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Abstract: There is a high prevalence of malnutrition in local nursing homes and hospitals.1,2 As such it is important to develop a systemic and practical approach to identify this group at patients during their stay in community hospitals to improve their clinical outcome. *Aims:* Our objectives are to find out the prevalence of malnutrition in elderly (age > 65) patients on admission and on discharge from a community hospital and develop a quality indicator to assess patients' change in nutritional status. *Methods:* The mini-nutritional assessment administered for geriatric patients (age \geq 65 years old) admitted to a community hospital over a 3 month period on admission and before discharge. Demographics data, Charlson Score, Modified Barthel Index score (on admission and before discharge), mode of feeding and length of stay are also obtained. The newly proposed nutritional assessment score on discharge minus score on admission) / Mini-nutritional assessment score on admission. *Results:* 33.8% of the patients were malnourished on admission using the mini-nutritional assessment. The mean Inpatient Nutritional Improvement Score was 0.19. The factors correlated with a higher score are presence of nasogastric tube on admission, oral supplements and a longer length of stay. Age, initial Barthel, Charlson score, race, gender (Chinese) and number of dietitian reviews were not significantly related with the Inpatient Nutritional Improvement Score is simple to calculate and is useful to track the nutritional improvement of patients in a community hospital.

Key words: Nutritional status, nutrition assessment, nutrition therapy, clinical audit, outcome assessment (health care), community hospital.

Introduction

There is a high prevalence of malnutrition in local nursing home (39% using MNA) and tertiary hospitals (29% using subjective global assessment score) (1, 2). However, there are no published studies on malnutrition in community hospitals. As such it is important to develop a systemic and practical approach to identify this group at patients during their stay in community hospitals to improve their clinical outcome.

The Mini Nutritional Assessment (MNA) is a widely used validated tool to assess for malnutrition and help to assessment of the improvement in nutritional status after these interventions. A hospitalized patient with low MNA score is correlated with increased hospital mortality, increased rate of discharge to nursing homes and a longer length of stay in the hospital (3). The MNA is also easily administered and does not require any blood tests to be done (4). Therefore the authors propose the use of MNA to systemically identify and follow-up on malnourished patients and those at risk. It can be administered by health professionals in a variety of settings and takes 10-15 minutes to complete. With thorough training in taking simple anthropometric measurements (mid-arm and calf circumference measurements), support staff can also learn to administer the MNA.

guide nutritional interventions. It is also useful in the

The authors propose an Inpatient Nutritional Improvement Score (INIS) as a quality indicator to allow community hospitals to monitor the patients' progress and implement changes to improve the nutritional status of patients. The proposed INIS will be a good tool for

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THE CHANGE IN MINI-NUTRITIONAL ASSESSMENT (MNA) SCORES ON ADMISSION AND DISCHARGE FROM AN ASIAN COMMUNITY HOSPITAL

institutions who serve elderly patients. It can assist top management to have a bird's eye view of nutritional interventions across such geriatrics facilities. This is likely to enable better distribution of resources to address and correcting malnutrition to enable better patient care. Our objectives are:

1. To find out the MNA score of elderly (age > 65) patients on admission and on discharge from a community hospital and the factors affecting the charge in MNA scores.

- 2. To find out the prevalence of malnutrition of this group of patients on admission and on discharge.
- 3. To develop a quality indicator to assess how well a medical facility like a community hospital screen, initiate and manage nutritional interventions for malnourished patients and those at risk.

The community hospital where this study was done offers step down care facilities with the majority of the patients transferred from the acute hospitals with the main aim of facilitating their eventual discharge to patients' own home, nursing homes, sheltered homes or other long term care facilities. The most common diagnoses are hip fracture, strokes, chest infections, urinary tract infections and general functional decline. There are 201 inpatient beds and the usual length of stay is about 30 days.

Currently, in this community hospital, there is no standardized manner of screening all geriatric patients for malnutrition on admission. Screening is done by usual clinical practices such as using the patients' weight, height, BMI, previous discharge summaries and clinical examination.

Methods

The full MNA was done for all geriatric patients (age \geq 65 years old) admitted to the community hospital over a 3 month period (from 19 May 11 to 19 Jul 11). The MNA was administered on admission and within 3 days of the discharge date.

The data collection and MNA was done by a trained dietitian assistant. She is supervised by the dietitian who checks her scoring for consistency as well as accuracy. For patients receiving total parenteral nutrition, tube feeding, or oral liquid supplementation, items J, K, and L are each scored as 0. Caregivers were interviewed for patients who are uncommunicative. Translators were used for subjects who did not understand English or Chinese.

Patients who were admitted for palliative care and patients with progressive neurological disorders were excluded. The following data were collected: name, age, date of birth, height, weight, race, list of chronic diseases (Charlson Score) (5), the Modified Barthel Index (MBI), mode of feeding and length of stay in the community hospital. Data collected was keyed into SPSS and analysis was performed using SPSS tools.

The proposed score, the Inpatient Nutritional Improvement Score (INIS) is calculated by the following formula: (MNA score on discharge - MNA score on admission)/MNA score on admission

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Results

The baseline characteristics of the patients are as shown in Table 1. 204 subjects were screened both on admission and on discharge. Table 2 shows MNA, BMI and calf circumference of the patients on admission and before discharge. The percentage of patients on oral supplements on admission was 6.37% (13 out of 204). The average length of stay was 33.6 days. The average number of review by a dietitian was 1.44 times.

Table 1					
Baseline characteristics and nutritional status on					
admission					

	Mean	Standard
		Deviation
Age	76.7	7.55
Height	161.4	6.87
Charlson Score ⁶	4.5	3.12
MBI (only 197 of 204 had		
Barthel recorded)7	41.1	20.25
BMI	20.2	4.21
MNA (Nestle)	17.9	3.29
MAC (cm)	24.7	3.69
CC (cm)	29.6	3.75
	Number	Percentage (%)
Male	80	39.2
Female	124	60.8
Chinese	174	85.3
Malay	13	6.4
Indian	12	6.0
Others (Include Eurasians)	5	2.5
On NG tube feeding	24	11.8
On oral feeding	180	88.2

 Table 2

 MNA, BMI, Calf Circumference (CC) on admission and before discharge

	Mean (on admission)	Standard deviation	Mean (on discharge)	Standard deviation
Weight	52.4	11.3	52.2	10.8
BMI	20.2	4.21	20.1	4.13
MNA (Nestle)	17.9	3.29	20.9	2.89
MAC (cm)	24.7	3.70	24.8	3.64
CC (cm)	29.6	3.75	29.6	3.78
Barthel	41.1	20.3	60.5	24.8
	(197 of 204		(151 of 204	
	patients)		patients)	

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 Table 3

 Linear Regression for Difference in MNA / Baseline MNA (Nestle)

	Unst	andardized	Standardized		
	Со	efficients	Coefficients	-	
	В	Std. Error	Beta	t	Sig.
1 Age	.002	.002	.076	1.090	.277
2 MBI score on admission	.001	.001	.050	.584	.560
3 Charlson score	001	.005	021	291	.771
4 Gender (Male)	041	.031	093	-1.351	.178
5 Race (Chinese)	.062	.042	.103	1.497	.136
6 Presence of NG tube (admission)	.158	.067	.215	2.368	.019
7 Use of oral supplements	.129	.047	.235	2.727	.007
8 No of dietitian's reviews	003	.007	035	353	.725
9 Length of stay	.004	.001	.266	3.597	.000

Figure 1



Figure 2 Difference in MNA score over baseline MNA (INIS)



Discussion

Our study showed that the prevalence of malnutrition in AMKCH is 33.8% (on admission). This is consistent with other local studies done in nursing homes (39% using MNA) and tertiary hospitals (29% using subjective global assessment score in adults) (4, 5).

The variable which is associated with a higher MNA score on admission was MBI score on admission. This is to be expected as a higher function will likely to be associated with better nutritional status. The variables

that correlated with a poorer MNA score on admission were presence of NG tube on admission and race (Chinese). Age, Charlson score and gender were not significantly correlated with the initial MNA. A higher age and Charlson score are expected to be correlated to poorer nutrition but this correlation was not found.

Graph 1 shows the distribution of the difference in MNA (Nestle) on discharge and on admission divided by the patient's admission MNA. The mean INIS is 0.19. The score decreased in 6.4% and remained the same for 12.7% of patients. The rest showed improvement.

The factors correlated with a higher INIS are presence of NG tube on admission, oral supplements and a longer length of stay. (see table 3)

Presence of nasogastric tube on admission: This is correlated with a positive nutritional improvement. A patient on tube feeding is likely to improve over time with the dietitian adding the necessary supplements to the patients' feeds. A patient without nasogastric tube feeding may require more time to improve as he may not necessarily take all the prescribed supplements due to poor oral intake. Another explanation is that patient on tube feeding usually start with a lower MNA score which may drastically improve once the tube is weaned off by a speech therapist.

Use of oral supplement: Patients who are on oral nutritional supplements had a better INIS score.

Length of stay: A patient who stays for a few days will not have as much improvement in nutritional assessment scores compared to a similar patient staying for a month. There is a significant correlation with the length of stay.

Other variables:Age, MBI score on admission, Charlson score, Gender (Male), Race (Chinese), number of dietitian's reviews were not significantly co-related with the INIS. Clinically this is to be expected as the improvement in nutrition may not be related to the patients' condition and function before getting admitted to a community hospital.

A patient INIS provides valuable information about the patient's nutritional status and the change in nutrition over the inpatient stay. Including it in the discharge summary will be very useful for subsequent follow-up visits. A quick reference to the INIS will enable the healthcare team to grasp the patient's baseline nutritional status. The dietitian may not only need to follow-up patients with low MNA score on discharge, but also patients with a negative INIS score.

In the hospital, a list of all the patients with a negative INIS may prompt further actions on subsequent visits. These patients may need to be follow-up more closely with a dietitian. The INIS score can also help a hospital keep track of how well they are doing in terms of improvement of patients' nutrition. Some common changes proposed to improve nutrition are increasing dietitian services, improving quality of the food, changing the methods of feeding as well as increasing THE CHANGE IN MINI-NUTRITIONAL ASSESSMENT (MNA) SCORES ON ADMISSION AND DISCHARGE FROM AN ASIAN COMMUNITY HOSPITAL

manpower for feeding patients. The INIS will provide an objective measure of that improvement.

Introducing it in different community hospitals will enable the individual hospitals to benchmark themselves in terms of nutritional improvement. A poor INIS may prompt a hospital to look into their processes in terms of initial screening and nutritional interventions. The other community hospitals (in Singapore) have patients with similar disease profile and demographics. Thus, their patients should have similar nutritional status with the subjects in this study.

Limitation of this study was that 109 patients were not captured in the data for various reasons as stated above. (see Figure 1). This is one of the limitations of the MNA and INIS. MNA cannot be done for patients who are bed bound and not able to sit on the weight machine.

Another limitation is that the INIS is affected by the length of stay. Obviously a patient who stays for 1 week may not have improvement over another similar patient who stays for 4 weeks. Thus, the INIS must be reported with the length of stay.

One more limitation was that the MNA originated from Europe or countries with Western health care practice settings. The MNA is not directly applicable in many ethnic groups or countries or those with non-Western cultural and dietary habits or health care systems. However, it has been used nutritional studies in Japan, Taiwan, China, India, Thailand, Singapore and other Asian countries (1, 4, 8-10).

Even though the Charlson score was taken for the subjects to correct for disease playing a role in the nutritional status, we were not able to differentiate those having gastrointestinal disease like inflammatory bowel disease or liver disease which may cause poorer appetite and thus affect nutrition. We also did not collect information on the type and number of medications taken by the subjects.

Prevalence of malnutrition in the community hospital: Using a confidence level of 95%, margin of error of 5% and estimated prevalence of 30%, the sample size calculation for accurate determination of the prevalence of malnutrition is 323 subjects. This study with only 204 subjects is underpowered for the purpose of finding out the prevalence of malnutrition in the community hospitals. However, it can serve as a pilot study for a larger study in future.

33.8 % of patients are in the malnourished group on admission. 64.7 % are at risk of malnutrition. With a large proportion of patient being malnourished and in the at-risk group, a formal nutritional screening (example using the MNA) should be recommended for all geriatric patients admitted to a community hospital.

Assessment on admission enables the healthcare team

to pay more attention to the patients' nutritional state. Assessment on discharge enables the team to give more dietary counseling before discharge. All patients should be screening objectively using MNA. However, the BMI is not useful enough to pick up any improvements in the patients' nutritional status. The data showed that mean BMI actually dropped from 20.2 to 20.1. The mean MNA (nestle) score is able to pick up an improvement of 17.9 to 20.9. This is to be expected as MNA not only takes the weight into consideration; it also consists of components like method of feeding and oral intake.

Even though the results do not suggest that the number of dietitian reviews is associated with higher nutritional improvement, this does not suggest that the dietitians are not effective in improving the patients' nutrition. MNA is a simple form and it does not have to be done by a dietitian. A healthcare worker with a few hours of training will be able to do the task.

Conclusion

There is a high prevalence of malnutrition in the community hospital. The proposed Inpatient Nutritional Improvement Score is simple to calculate and is useful to track the nutritional improvement of patients in a community hospital.

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