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AN AUDIT OF NUTRITIONAL STATUS OF PRE-OPERATIVE SURGICAL PATIENTS IN REHMAN MEDICAL INSTITUTE

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ABSTRACT

Introduction: The word Malnutrition is used for a broad spectrum of conditions ranging from under-nutrition to over-nutrition; it is a risk factor and health outcome for many diseases, increasing the risks of morbidity and mortality. The study was conducted to identify whether malnutrition exists in pre-operative surgical patients admitted in a tertiary care hospital in Peshawar.

Material & Methods: A prospective, cross sectional study was conducted on patients from all surgical specialties of Rehman Medical Institute from June to November 2016; total sample size taken was 221 using WHO formula and simple random sampling technique was used for sampling. All patients of ages 18 years and above from surgical departments were included; however, Gynecology patients, Intensive Care Units and patients with altered level of consciousness were excluded. The previously validated Mini Assessment Form was used to collect data, which were analyzed for descriptive statistics by SPSS version 15.0.

Results: Of 221 patients, 121(54%) were male and 100(45%) were female patients. Mean age of patients was 42.61±15.744 years, mean height was 164.3±14.20 cm, and mean weight was 74.6±15.90 kg. Overall 15 patients (6.8%) were identified as malnourished, 74 patients (33.5%) were at risk of malnutrition, while 132(59%) were having normal nutritional status.

Conclusion: Malnutrition is a relatively common problem in patients admitted to Rehman Medical Institute for surgical procedures. There is a need to develop a comprehensive strategy to identify patients with malnutrition or at risk of malnutrition at preoperative stage in order to achieve optimum results.

Key words: Malnutrition; Nutritional Status; Diet; Nutritional Requirements; Patients.

INTRODUCTION

WHO defines Nutrition as the intake of food considered in relation to body's dietary needs. Malnutrition is directly responsible for 300,000 deaths per year in children younger than 5 years in developing countries and contributes indirectly to more than half the deaths in childhood worldwide. In developing countries, poor perinatal conditions account for 23% of deaths in children younger than five. Malnourished women are at high risk of giving birth to low birth weight infants (15-20% of all births worldwide).[1] Although death from malnutrition in the United States is rare, in developing countries, more than 50% of the 10 million deaths each year are either directly or indirectly secondary to malnutrition in children younger than 5 years.[2] Data from studies in outpatient clinics suggests that 16-21% patients are at risk of malnutrition (medium and high risk) with those at risk experiencing significantly more hospital admissions and significantly longer length of hospital stay.[3-5]

Malnutrition is the cellular imbalance between the supply of nutrients and energy, and the body's demand for them to ensure growth, maintenance and specific functions. The consequences of malnutrition are impaired wound healing,[6] increased risk of post-operative infection,[7] and impaired GI cardiovascular and

respiratory tract function[8]. It also increases hospital stay of the patient,[9] and increases mortality and morbidity[10,11]. Primary malnutrition is caused by low birth weight, lack of adequate food, deliberate low consumption of food, and other similar causes. Secondary malnutrition is caused by increased requirements, inability of food intake, failure of absorption of nutrients from food due to medical conditions, failure of utilization of nutrients within the body, and excessive removal of nutrients from the body. Malnutrition is a wide spread problem in developing and deprived countries where malnutrition is more commonly found due to the unavailability of food, lacking in quantity, quality or a combination of both. Malnutrition not only leads to disease but also effects its progression and course.

It is anecdotally observed that the patients which we receive in our surgical practice are generally of poor nutritional status. As malnutrition leads to prolonged surgical recovery and delayed wound healing, it was decided to conduct an audit of Nutritional status of pre-op surgical patient in Rehman Medical Institute. The objective of the study was to identify whether malnutrition exists in pre-operative surgical patients admitted in a tertiary care hospital in Peshawar. This study stresses the importance of identifying patients with malnutrition pre-operatively to improve post-operative treatment outcome.

MATERIALS & METHODS

A prospective, cross sectional study was planned for a duration of 6 months (June-November 2016). Patients from all surgical specialties of Rehman Medical Institute were included in the study except Gynecology and ICU patients. Any patient with altered level of consciousness and age below 18 were excluded from this study.

Sample size was calculated at 221 using WHO standard formula $(Z^2*(p*q) / E^2$. Where Z = 1.96, P= prevalence, q= (1-p), E2= allowed error).

Data was recorded using Mini Nutritional Assessment (MNA) form, developed in 1989 by Toulouse University Hospital, France and Nestle Research Center, Switzerland.[12] The MNA form has two components, the screening and assessment parts. There are six questions in the screening part and twelve questions in the assessment part. A single researcher interviewed all patients.

Data were analyzed by SPSS version 15.0 for descriptive statistics.

RESULTS

In a total sample of 221 patients, 121(54%) were male patients and 100(45%) were female patients. The mean age of all the patients was 42.6±15.7 years (Table 1). The mean weight of all patients was 74.63±15.90 kg and the mean height was 164.3±14.2 cm.

Table 1: Demographic & Anthropometric characteristics of patients (n=221).

#	Variables	Frequency (%) / Mean ± SD
1.	Gender Male Female	 121 (54%) 100 (45%)
2.	Age (years)	42.61±15.744
3.	Weight (kg)	74.6±15.90
4.	Height (cm)	164.3±14.20

Responses to the six Screening questions are presented in Table 2. To the first question, respondents reported that there was severe decrease in food intake (over the past three months) in 26(11.8%) patients, and moderate decrease in 48(21.7%) patients. To the second question, 43(19.5%) patients reported weight lost more than 3kg over the last three months, while 45(20.4%) patients had 1 to 3kg weight loss. To the third question, 3(1.4%) patients reported they were bed or chair bound, and 21(9.5%) patients were able to get out of bed / chair but not go out. The fourth question was about psychological stress or acute disease that

the patient may have had suffered over the previous three months, to which 57(25.8%) patients responded positively. Regarding question five on other neuropsychological problems, 8(3.6%) patients reported severe dementia or depression, and 18(8.1%) patients had mild dementia. Question six was related to calculating the BMI; 10(4.5%) patients had BMI less than 19, 17(7.7%) patients had BMI 19-21,

32(14.5%) patients had BMI 21-23. and 162(73.3%) patients had BMI 23 or above.

At the end of screening test (maximum 14 points), 16(7.2%) patients were designated malnourished, 90(40.7%) patients were at risk of Malnutrition and 115(52%) patients were found to have normal nutritional status.

Table 2: Responses to Screening Questions on MNA by patients (n=221).

#	Screening Questions	Frequency (%)
1.	**Decrease in food intake (past 3 months)**	
	No decrease	147 (66.5)
	Moderate decrease	48 (21.7)
	Severe decrease	26 (11.8)
2.	**Weight loss (kg) (past 3 months)**	
	No loss	108 (48.9)
	1-3	45 (20.4)
	>3	43 (19.4)
	No knowledge	25 (11.3)
3.	**Mobility**	
	Goes out	197 (89)
	Able to get out of chair/bed but not go out	21 (9.5)
	Bed or chair bound	03 (1.4)
4.	**Psychological stress / Acute disease (past 3 months)**	
	No	164 (74.2)
	Yes	57 (25.8)
5.	**Neuropsychological problems**	
	None	195 (88.2)
	Mild dementia	18 (08.1)
	Severe dementia / depression	08 (03.6)
6.	**BMI groups**	
	<19	10 (4.5)
	19 to <21	17 (7.7)
	21 to <23	32 (14.5)
	23 or above	162 (73.3)

The second component of the MNA Form comprised detailed assessment of patient's nutritional status (Table 3). The first question was regarding state of dependency; 210(95.0%) patients were living independently. The second question of taking more than three prescription drugs per day was answered affirmatively by 69(31.2%) patients. Regarding question three about presence of any pressure sores or skin ulcers, 05(2.3%) patients reported such lesions. Regarding question four on eating patterns, 171(77.4%) patients were taking three full meals daily. In response to question five regarding protein consumption, 104(47.1%) patients took at least one serving of dairy products, milk, cheese, yogurt per day; 179(81%) patients took two or more servings of legumes or eggs per week; 117(52.9%) patients consumed meat, fish or poultry daily. In question six about ≥2 servings of fruits or vegetables per day, 162 patients (73%) responded positively. For question seven about daily fluid intake, 165 patients (74.7%) consumed more than 5 cups daily. Question 8 was about mode of feeding; 218(98.6%) patients self-fed

without any problem. Patients' self-view of nutritional status was question 9; 139(62.9%) patients considered themselves as having no nutritional problem. For question ten, comparing their health with people of similar ages, 59(26.7%) patients reported not as good, 69(31.2%) said as good, and 81(36.7%) said better. Mid arm circumference (MAC) of 212(95.9%) patients were more than 22 cm. Calf circumferences (CC) of 184(83.3%) patients were above 31cm.

Table 3: Assessment of nutritional status of patients (n=221).

#	Assessment of Nutritional Status	Responses f (%)
1.	**Lives Independently**	
	Yes	210 (95.0%)
	No	11(5.0%)
2.	**More than 3 prescription drugs per day**	
	Yes	69 (31.2%)
	No	152 (68.8%)
3.	**Pressure sores or skin ulcers**	
	Yes	5 (2.3%)
	No	216 (97%)
4.	**Number of full meals per day**	
	One	09 (4.1)
	Two	41 (18.5)
	Three	171 (77.4)
5.	**Protein Intake**	
	Dairy products per day	104 (47.1%)
	Legumes or eggs per week	179 (81%)
	Meat, fish, poultry per day	117 (52.9%)
6.	**Two or more servings of Fruit and vegetables intake per day**	
	Yes	162 (73%)
	No	59 (26.6%)
7.	**Fluid (water, juice, coffee, milk, tea…) consumed per day cups/day)**	
	< 3	09 (04.1)
	3 – 5	47 (21.2)
	> 5	165 (74.7)
8.	**Mode of Feeding**	
	Self-fed without difficulty	218 (98.6)
	Self-fed with help	-
	Unable to feed without assistance	03 (1.4)
9.	**Self-view of nutritional status**	
	No nutritional problem	139 (62.9)
	Uncertain of nutritional state	37 (16.0)
	Views self as malnourished	45 (20.4)
10.	**Health status compared to other people of same age**	
	As good	69 (31.2)
	Not as good	59 (26.7)
	Better	81 (36.7)
	Does not know	12 (05.4)
11.	**Mid-Arm Circumference (MAC) in cm**	
	< 21	02 (0.9)
	21 – 22	07 (3.2)
	> 22	212 (95.9)
12.	**Calf Circumference (CC) in cm**	
	< 31	37 (16.7)
	≥ 31	184 (83.3)

After collecting the required data, screening and assessment scores were added and a total score was calculated as the Malnutrition Indicator Score (MIS). Patients whose MIS was less than 17 points were designated Malnourished, MIS between 17-23.5 points were designated At Risk of Malnutrition, while those who had MIS between 24 to 30 points were considered having Normal Nutritional Status.

By aggregating the scores, 15(6.8%) patients were identified as malnourished, 74(33.5%) patients were found to be at risk of malnutrition, while 132(59.7%) patients were identified as having normal nutritional status.

Of the patients who were identified as malnourished 5(4.1%) were male and 10(8.2%) were female; 37(30.6%) males and 38(38.0%) females were found to be at risk of malnutrition (Table 5). The gender differences were statistically significant (p=0.071).

Table 5: Malnutrition Indicator Score of patients (n=221).

Categories	Frequency (%)		p value
	Male	**Female**	
Malnourished (Less than 17 points)	05 (4.1%)	10 (10.0%)	
At risk of malnutrition (17-23.5 points)	37 (30.6%)	38 (38.0%)	0.071
Normal nutritional status (24-30 points)	79 (65.3%)	52 (52.0%)	

Figure 1 shows the specialty-wise distribution of nutritional status; the highest percentage of malnourished patients were in Cardiac surgery (04/36, 11.1%), followed by Orthopedic Surgery (01/11, 09.1%), Urology (01/14, 07.1%), Maxillofacial Surgery & ENT (01/21, 04.8%), and General Surgery (04/129, 03.1%). Similarly, in Cardiac Surgery 19/36(52.8%) patients were at risk of malnutrition, followed by Maxillofacial Surgery & ENT 09(42.8%), Neurosurgery (03/10, 30%), Orthopedic Surgery (03/11, 27.3%), General Surgery (29/129, 22.5%), and Urology (02/14, 14.2%).
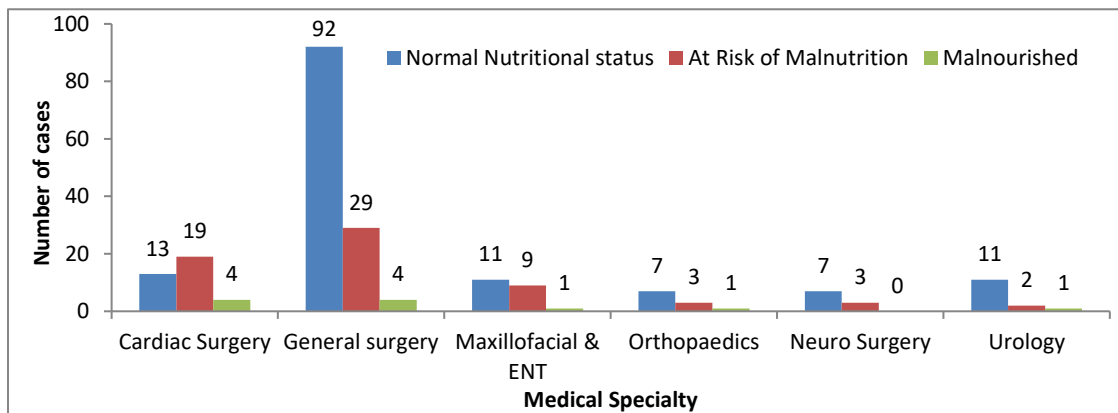

Figure 1: Frequency distribution of nutritional status by clinical departments (n=221).

DISCUSSION

According to the WHO paper on state of food insecurity estimated 852 million people were found to be undernourished with most living in developing world.[12]

Malnutrition has two main types. Protein energy malnutrition and micronutrient deficiencies. Globally these are the most important risk factors for illness and death, affecting particularly

pregnant women and young children. The main underlying factor behind these deficiencies is poverty.[13,14] Malnutrition is consequently the most important risk factor for disease in developing countries and is directly responsible for about 300,000 deaths per year.[15,16]

Various screening tests with varying level of validity are available in literature to assess malnutrition in general population and hospital setting. Dietician society of Australia after considering levels of evidence reported that there are five screening and three assessment tools that can be used to assess malnutrition in acute setting.[17]

Malnutrition screening tool (MST) has three questions that assess recent weight and appetite loss. It is validated for use in general medical, surgical and oncology patients.[18] Malnutrition universal screening tool (MUST) is validated to be used in hospitals and nursing homes. It measures body mass index (BMI), unplanned weight loss and presence or absence of any serious illness to determine if nutritional interventional is required.[19] Nutritional risk screening (NRS), short nutritional assessment questioner (SNAQ) and subjective global assessment (SGA) are other such tools for assessment of malnutrition that are available in literature.[20]

For this study, the Mini Nutritional Assessment (MNA) form was chosen.[12] It was first developed in 1989 by a combined team of Toulouse University Hospital, France and Nestle Research Center, Switzerland. It was further validated by the same team in 1994 in a cohort study of 150 patients in Toulouse. Currently the database has more than 1100 published research articles that reference the MNA. It is an easy to use form with no financial cost involved, and a single researcher is required to record data. MNA detects malnutrition even before changes in weight or serum proteins.[21]

In an extensive literature review performed by Kaiser et al,[22] 24 data set from 12 countries were further analyzed. They found that 69% patients were either suffering malnutrition or were at risk of malnutrition. However, they found a difference of prevalence from different settings: rehabilitation 50.5%, hospital 38.7%, nursing home 13.8%, and community 5.8%. In the combined database, 46.2% of study participants were at risk of malnutrition.

In a very similar study conducted in Brazilian hospital,[23] 48.1% patients were identified as malnourished. The prevalence of malnutrition was higher in the northern and northeastern regions of Brazil. Malnutrition correlated with low income, primary diagnosis at the time of admission in the hospital, age, presence of cancer or infection and prolonged hospital stay.

Malnutrition remains a major health problem throughout the developing world.[24,25] Diet in these countries is frequently deficient in either micro and macro nutrients or both.[13,26]

Macronutrients or protein-energy deficiency is due to insufficient supply of proteins, carbohydrates and fats. Other major cause is chronic infection particularly those which causes diarrhea. It leads to metabolic and immunological disturbances. Pigments formation is affected and fats degeneration at various organs takes place. Emergency measures are taken to reduce the risk of hypoglycemia, hypothermia and dehydration.[27-29]

Micronutrient deficiencies effect almost 2 billion people worldwide.[25] While Iron, Iodine Vitamin A and Zinc remain the most common one, vitamin C, D and B deficiencies have declined.[30,31]

Kamal et al[32] performed an observational study on patients admitted in a General Surgical Ward at a tertiary hospital of Punjab to record their nutritional status. Total number of patients were 280. 112 (40%) patients were found malnourished, 90 (32%) patients were at risk of

malnutrition while 78 (28%) patients had normal nutritional status.

Another observational study performed in a tertiary care hospital in India on ICU patients. 500 patients were screened for their nutritional status. A total of 198 (39.6%) patients were found to be malnourished.[33]

Agriculture University of Peshawar, Pakistan performed a similar study on hospitalized patients of KTH and HMC.[34] A total of 355 patients were studied. Anthropometric measurements included in the study were Weight, height, head circumference (in case of children), upper arm circumference (in case of adults) and skinfold thickness and biochemical measurements includes hemoglobin and blood sugar levels were recorded and data was compared with standards values. Results showed that adolescent patients had 100% malnourishment when their anthropometric and biochemical measurements were compared with reference values. In pediatric population, malnutrition was again found in all groups except between age 6 to 10 years.

The present study identified 15(6%) patients as malnourished, and 75(33%) at risk of malnutrition, while 131(59%) were of normal nutritional status. As compared to the three previous studies conducted in Subcontinent,[32-34] the malnutrition found in is the current study is markedly less. The reason could be that comparatively affluent part of society visits private institute that is Rehman Medical Institute. Nevertheless, malnutrition remains a major issue in the third countries in general and Pakistan in particular. There is need to develop a comprehensive policy to address conditions that lead to malnutrition and its subsequent results.

CONCLUSION

The levels of malnutrition in preoperative inpatients at a tertiary care hospital of Peshawar, Khyber Pakhtunkhwa, were low compared to other studies in the country, and may represent the more educated and affluent clientele of the institution.

RECOMMENDATION

Identification of patients who are either malnourished or at risk of malnutrition pre-operatively should be made a routine part of inpatient healthcare to achieve optimum patient response to surgery.

ACKNOWLEDGEMENT

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