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A HAEMODIALYSIS NUTRITIONAL SCREENING TOOL FOR NURSES - A PILOT STUDY

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SUMMARY

The purpose of the study was to pilot a nurse-performed nutritional screening tool (NST) for dialysis patients in order to identify nutritionally at-risk patients.

Haemodialysis (HD) patients are at risk of nutritional-related problems. Nutritional screening by nurses may assist in the early recognition of and response to these problems.

An NST was developed using 9 screening parameters. (BMI, weight change, poor appetite, GI symptoms, albumin, pre-dialysis urea, K⁺, PO₄⁺⁺, HbA1c). The NST was compared with Standard Dietitian Assessment (SDA).

44 HD patients were screened with the NST and then with SDA.

The tool showed sensitivity of 0.7 (95%CI +/- 0.21) and a specificity of 0.77 (95%CI +/- 0.16).

Reliability was low (alpha = .18). Alpha increased to 0.32 if pre-dialysis urea was removed from the tool and increased to 0.48 if weight loss, appetite, K⁺ and PO₄⁺⁺ were used alone.

The pilot study showed a low reliability of the NST compared with SDA. With further analysis and modifications, the NST has the potential to assist nutritional screening by nurses in dialysis centres that have limited dietetic access.

KEY WORDS

- Nutrition
- Screening Tool
- Dialysis
- Nursing

BIODATAS



INTRODUCTION

As people with end stage renal disease (ESRD) progress towards renal replacement therapy (RRT) there is often a multifactorial decline in nutritional status (1-3). The incidence of protein energy malnutrition (PEM) in dialysis patients is exacerbated by uraemia, the need for dietary restrictions for potassium and phosphate, as well as by the haemodialysis process itself, which stimulates net protein catabolism. Recent research and clinical observation suggests that nutritional status often improves on the commencement of dialysis, however malnutrition in maintenance haemodialysis patients is still prevalent (4).

Malnutrition assessment and treatment is a great challenge for nephrological care (5).

Determination of nutritional status has often been based on objective measures such as biochemical parameters and anthropometric measurements (1,2). Other methods have been used to measure body composition (dual-energy X-ray absorptiometry (DEXA), nuclear magnetic resonance, computerised tomography (CT), ultrasonography, bioelectrical impedance and total body H₂O) (1,2,6). However, there is no single measurement that can

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Item No.	Nutritional Screening Tool Item	Definition of at risk factor
1	Body Mass Index (BMI)	BMI <20 or >30
2	Intentional Weight Change (% kg)	Increase or decrease by 5% over past 3 months
3	Poor Appetite	If patient states that 'their appetite is poor'
4	Gastrointestinal Symptoms	If condition: nausea, anorexia, diarrhoea > 2 weeks
5	Serum Albumin (mid-week)	Serum Albumin <38 g/L
6	Urea Analysis (mid-week)	Pre-dialysis Urea (mmol/L) > 11 mmol/L
7	Serum Potassium	Serum Potassium > 8mmol/L
8	Serum Phosphorus	Serum Phosphorus > 2.0mmol/L
9	Glycosylated Haemoglobin (HbA1c)	HbA1c > 8% if patient is diabetic

Table 1: Items tested in nurses' screening tool.

absolutely identify malnutrition. This is further complicated in haemodialysis patients, since many of the conventional nutritional indicators are altered in the presence of renal disease (6).

Nutrition screening in many clinical areas has been shown to assist in the early recognition and response to nutritional problems resulting in improved health outcomes (7,8).

Nutritional screening is a simple and rapid process by the nurse to identify those at risk so that the dietitian can perform a comprehensive nutritional assessment (4). Although there has been a focus on 'malnutrition screening tools' in recent times, few of these have looked at other nutritional markers such as glycaemic control, electrolyte management and hyperphosphataemia.

The authors have developed a nutritional screening tool (NST) that is simple and easy to use by nursing staff (9). To test the reliability of the tool a study was designed to compare the NST with clinical assessment of whether a patient was actually nutritionally at risk. This created a problem as there is no recognised simple measure for a renal patient's at-risk status. The current gold standard to determine whether a patient is at risk

SCREENING TOOL	SDA ASSESSMENT	
	At Risk	Not at Risk
At Risk	12	5
Not at Risk	1	26

Table 2.

of malnutrition is the Subjective Global Assessment (SGA), a tool that is widely used today (10). Although the SGA was originally developed to categorise surgical patients it has been used to assess ESRD patients in both HD (11) and peritoneal dialysis (PD) (12). The use of the SGA was considered inappropriate for the validation of the NST that the authors' had developed. This was supported by Oakley and Hill who suggest that the dietitian is well placed to validate a nutritional screening tool (13). Thus the Standard Dietitian's Assessment (SDA) was utilised to validate the tool's reliability. The following paper describes the development and validation of an originally developed NST.

METHODS

Following a process involving literature and cooperative clinical review it was concluded that there was no valid nutritional tool that was appropriate for the authors' satellite dialysis setting. Thus, a tool was developed that addressed major nutritional related problems (Table 1). If a score recorded 2 or more positive results amongst these risk factors they were considered nutritionally at risk by the screening tool.

Following ethics approval and informed consent procedures the participants were volunteers and consisted of patients with ESRD requiring haemodialysis treatment three times per week. They were treated at a 16-station dialysis unit in an inner city suburb. The majority of patients assisted in their care but were not totally self-caring.

Following a brief education session the nurses screened the participants with the tool and within 2 weeks a trained dietitian undertook a full SDA on the same patients. The SDA is the assessment that a qualified dietitian would undertake for any new patient (8). This included a thorough review of the patients' past medical and psychosocial history, anthropometry, biochemistry, current clinical issues, medications and dietary intake. The dietitian assessed the patient as either nutritionally 'at risk' (therefore requiring referral) or 'not at risk' (therefore not requiring referral) based on clinical assessment. The dietitian was independent and not involved in the patient's everyday nutrition care. The dietitian was blinded to the results of the NST.

RESULTS

Out of the 44 patients who were screened 12 patients were correctly identified as nutritionally at risk (sensitivity 0.7, 95%CI +/-0.21). 5 patients who were not screened at risk were found to be at risk by SDA. 21 patients were correctly identified as not at risk (specificity 0.77, 95%CI +/-0.16) and 6 patients who were screened and found not at risk were found to be at risk by SGA. Thus 33 (75%) patients were correctly identified and 11 (25%) were not (Table 2).

Reliability of the first 8 items found an Alpha coefficient of 0.1749.

A process whereby each item was deleted to find highest 'Alpha if Item Deleted' score found that the highest alpha achieved was if question 6 was removed. This increased the alpha to 0.3247. The data was then analysed to determine which combinations of questions would achieve the highest reliability. The final set of questions 2, 3, 7 and 8 gave an alpha of 0.48. Reliability of Question 9 was omitted as there was not enough data. This was associated with only 5 out of the 44 patients (11%) being diabetic. Interestingly, all 5 diabetic patients were identified by the screening tool as positively at risk. They were still identified at risk when question 9 was omitted. 46% of subjects had a BMI of greater than 30. 21% of subjects had unintentional weight changes. 7% of subjects reported poor appetite while 4% reported GI symptoms. 17% of subjects were found to have an albumin <38g/l. 30% of patients had a pre-dialysis urea of <20mmol/l with 20% >30mmol/l. 7% of subjects had a pre dialysis K+ >6mmol/l while 60% of subjects had pre-dialysis PO4++ measurements of >2mmol/l.

DISCUSSION

The aim of this study was to pilot the validation of an NST that would assist nursing staff at dialysis satellite centres make appropriate referrals to the renal dietitian. The screening tool was found to be simple and easy to use by nursing staff. The 9-item tool took 5 to 10 minutes to complete. Very little training and education was required as most items were immediately available to nursing staff.

Face validity of the NST was considered to be good because the tool identified that 70% of patients were correctly identified 'at risk' and 75% were correctly identified 'not at risk'. Thus, 75% of all patients screened were correctly identified when compared with SDA by a trained dietitian. Conversely, this equates to 25% of patients incorrectly screened. Many clinicians may find this unacceptable in a screening tool however other screening tools widely used have similar levels of sensitivity (10). A low validity of 0.1749 was identified when the NST was compared with SDA. This suggested that the tool needed refining and the results needed further investigation. Thus, when only 4 of the items were identified the validity increased to 0.48. These items were:

- Unintentional weight change of more than 5% in the previous three months.
- Patient report of poor appetite.
- Midweek pre-dialysis potassium >6mmol/l.
- Midweek pre-dialysis phosphate >2mmol/l.

SUMMARY

The improvement of the nutritional status of ESRD patients is desirable and leads to improved patient outcomes. Nurse-

performed nutritional screening can potentially identify nutritionally at risk patients who could then be referred to a trained renal dietitian. This pilot study has further contributed to the refinement of a potential screening tool that may lead to a valid nurse performed nutritional screening tool for satellite centre dialysis patients. The authors suggest the validation of the proposed 4-item nutritional tool. Thus, the contribution of this study has been to identify the potential for the development of a refined screening tool.

STUDY LIMITATIONS

Only 44 subjects were screened and to further validate the tool a greater subject population would be desirable. This tool was piloted on participants who were on thrice weekly dialysis and the application to more frequent and/or longer haemodialysis regimes may require additional research. It is acknowledge that age group differences were not taken into account when body mass index measurements were taken. The context was an inner suburban satellite dialysis centre in Australia and thus the results may not be transferable to another context.

FURTHER RESEARCH

This study suggests that a simpler 4-item NST may suffice for identifying nutritionally at risk patients in dialysis satellite centres. This 4-item NST would consist of weight change, poor appetite, potassium and phosphate. If the validity of this 4-item NST was supported by further research then this would lead to a more efficient, nurse-friendly nutritional screening tool.

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