Nutritional Assessment in Renal patients

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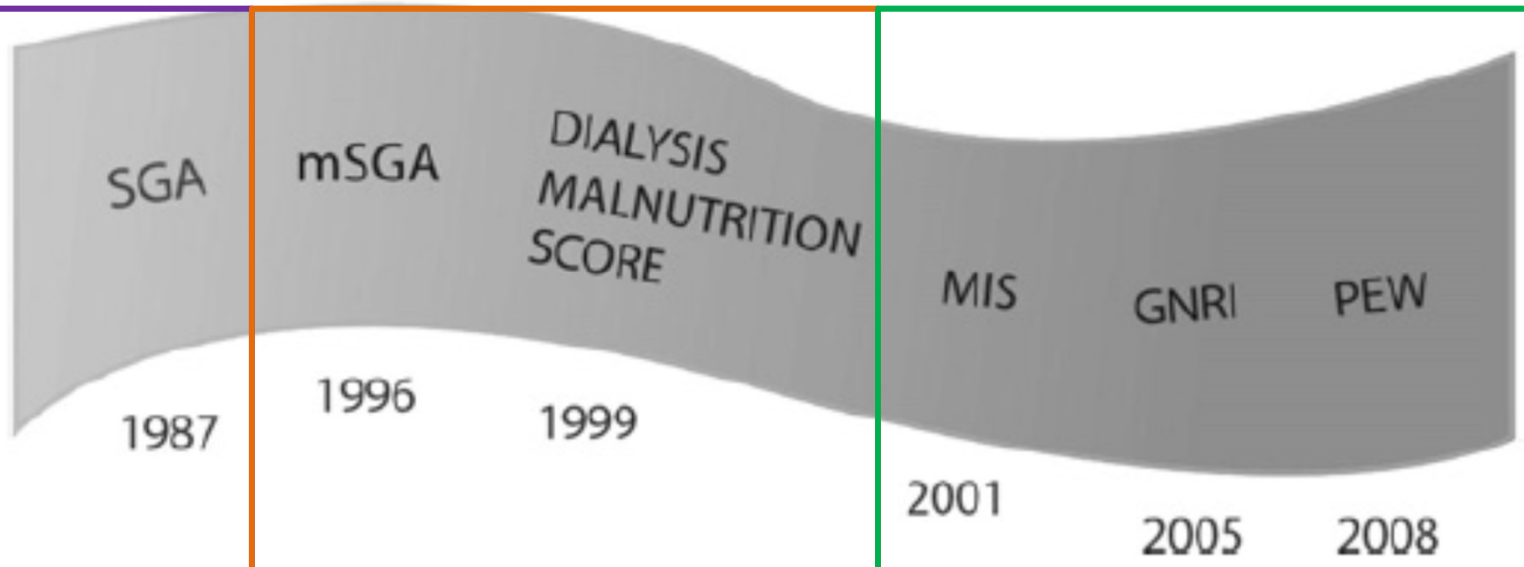
Nutritional Assessment

- Malnutrition is associated with increased morbidity and mortality.
- Timely recognition and management is of high priority.
- Nutritional assessment had to include methods to diagnose, classify predict malnutrition and monitor response to therapy.
- There is still much to do to fight PEW because present epidemiologic studies continue to report between 30% and 50% of patients with signs of malnutrition

***Protein-energy wasting (PEW), defined as reduced somatic and/or circulating body protein mass, decreased fat mass, and usually reduced protein and energy intake,**

Timeline of nutritional assessment scores



✓ A valid and clinically useful measure of protein-energy status in dialysis patients.	a fully quantitative scoring system consisting of 7 components (similar to SGA) with total score ranging between 7 (normal) and 35 (severely malnourished)	Quantitative, add on laboratory markers, e.g. Albumin, TIBC, PEW: +Muscle circumference area (comparing to reference population)

Subjective Global Assessment (SGA)

- ✓ Focus: nutrient intake and body composition.

- ✓ The KDOQI recommended SGA uses a 7-point scale
- ✓ CANUSA study in the CKD population: 7 points SGA

Outcome: 1-unit decrease in SGA equaled a 25% increase in mortality for CAPD patients.

- ✓ A one-page rating form can be used to record observations and the overall rating. The final rating is not an average of the individual category ratings, but subjective, based on the clinician's expertise and experience.

- ✓ Challenges: maintaining the subjectivity of the tool while maximizing inter-rater reliability.

Reference:
Pocket Guide to Nutrition Assessment of the Patient With Kidney Disease (5th Edition). National Kidney Foundation Council on Renal Nutrition; 2015.

SGA - Tips to Retain subjectivity

1. Training and a review of technique with co-workers who will be assessing common patients.

2. An estimate of current intake compared to recommended nutrient levels (considering the duration of deficit or excess)

3. Patterns of muscle wasting or preservation may be inconsistent depending on the physical activity/abilities of the patient. Get patient's perspective.

4. Evaluate tissue loss in relation to weight changes

5. Elderly patients typically have age-related tissue losses that mimic malnutrition. Get the patient's perspective.

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Pocket Guide to Nutrition Assessment of the Patient With Kidney Disease (5th Edition). National Kidney Foundation Council on Renal Nutrition; 2015.

SGA - Patient's perspectives

Example of standard questions to improve accuracy and consistancy	
Weight Changes (6 months and 2 weeks)	**For new patients:** Usual adult weight? **For existing patients:** 1) To use Dry Weight in Treatment Plan, if available Weight 6 months ago? Weight 2 weeks ago? 2) Any signs of fluid overload? Edema, SOB, HTN?
Current appetite/intake?	(Preferred) Is intake adequate to meet needs? Change in previous 6 months? Change in past 2 weeks?
GI Distress?	Anorexia, Nausea, Vomit, Diarrhea —frequency/duration of anorexia?
Function	Changes in function or activity related to malnutrition? (activities of daily living, household chores, energy levels, etc.)

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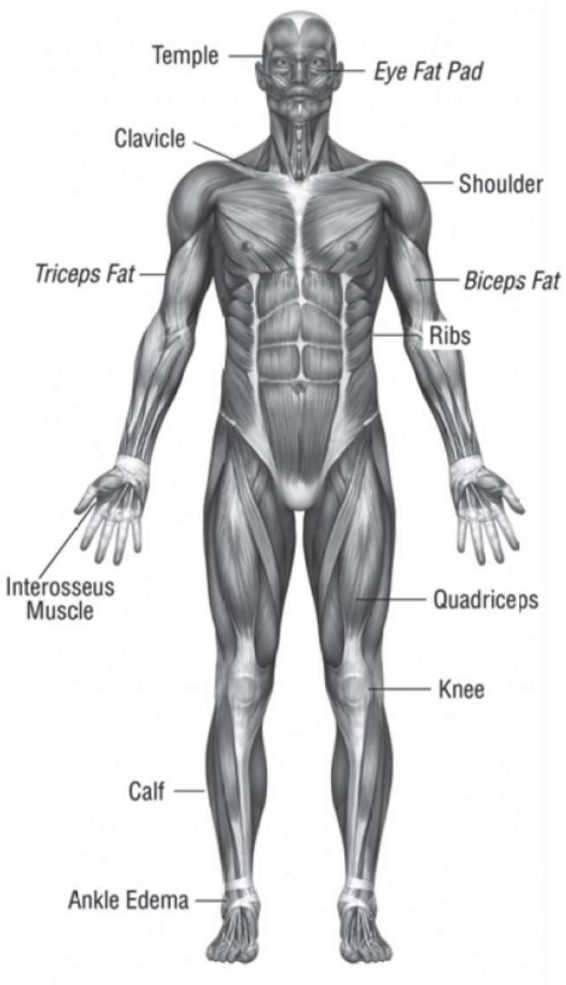

Reference:
Pocket Guide to Nutrition Assessment of the Patient With Kidney Disease (5th Edition). National Kidney Foundation Council on Renal Nutrition; 2015.

Face: Temple, Eye fat pad

Exam area	Tips	Level of Malnutrition		
		Severe 1 or 2 (C)	**Mild-Moderate 3 or 4 or 5 (B)**	**Well Nourished 6 or 7 (A)**
Below the eye *Subcutaneous fat	View patient straight on, touch above cheek bone	Hollow look, depressions, dark circles, loose skin	Slightly dark circles, somewhat hollow look	Slightly bulged fat pads, fluid may mask loss
Temple *Muscle wasting	Observe straight on, turn head side to side	Hollowing, scooping, indentation	Slight depression/ indentation	Can see/feel well-defined muscle

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References: McCann L. Subjective global assessment as it pertains to the nutritional status of dialysis patients. *Dialysis & Transplantation.* 1996;25:190.

Upper body: Clavicle, Shoulder

Exam arealk	Tips	Level of Malnutrition		
		Severe 1 or 2 (C)	**Mild-Moderate 3 or 4 or 5 (B)**	**Well Nourished 6 or 7 (A)**
Clavicle *Muscle wasting	Look for prominent bone. Make sure patient is not hunched forward	Protruding, prominent bone	Visible in male, some protrusion in female	Not visible in male, visible but not prominent in female
Shoulder *Muscle wasting	Arms at side, note shape	Shoulder to arm joint looks square	Acromion process may protrude slightly	Rounded, curves at arm/ shoulder/ neck

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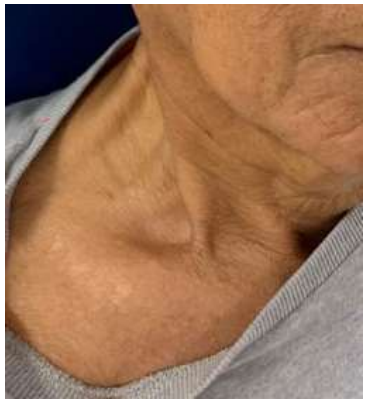
Upper body: Clavicle, Shoulder



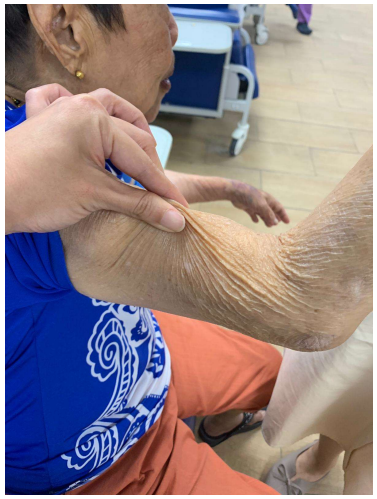
Upper body (Triceps/Biceps)

Exam area	Tips	Level of Malnutrition		
		Severe 1 or 2 (C)	**Mild-Moderate 3 or 4 or 5 (B)**	**Well Nourished 6 or 7 (A)**
Triceps/ biceps *Subcutaneous fat	Arm bent, roll skin between fingers, do not include muscle in pinch	Very little space between folds fingers touch	Some depth to pinch, but not ample	Ample fat tissue obvious between folds of skin
Interosseous Muscle *Muscle wasting	Thumb side of hand; pads of thumb/ forefinger touching	Depressed area between thumb/forefinger	Slightly depressed	Muscle bulges, could be flat in well-nourished person

References: McCann L. Subjective global assessment as it pertains tc status of dialysis patients. *Dialysis & Transplantation.* 1996;25:190.

Upper body:
Biceps, Triceps, Interosseus muscle





Lower body (Knee, Quadriceps, Calf)

Exam area	Tips	Level of Malnutrition		
		Severe 1 or 2 (C)	**Mild-Moderate 3 or 4 or 5 (B)**	**Well Nourished 6 or 7 (A)**
Knee *Muscle wasting	Have patient sit, leg propped up, bent at knee	Bones prominent, scant knee muscle	Knee cap less bony, more rounded	Muscle protrudes, bones not prominent
Quadriceps *Muscle wasting	Not as sensitive as upper body	Depression/line on thigh, between groin and knee	Mild depression on inner thigh	Well rounded, developed
Calf *Muscle wasting	Observe side and front view	Thin, minimal/no muscle definition	Not well developed	Well-developed bulb of muscle

References: McCann L. Subjective global assessment as it pertains to the nutritional status of dialysis patients. *Dialysis & Transplantation.* 1996;25:190.

Lower limbs: Quadriceps, Knee, Calf

Lower body (Oedema)

Exam area	Tips	Level of Malnutrition		
		Severe 1 or 2 (C)	**Mild-Moderate 3 or 4 or 5 (B)**	**Well Nourished 6 or 7 (A)**
Edema - In dialysis, edema is important for quantifying weight loss in view of fluctuating fluid balance.				
R/O other edema causes, patient at dry weight	View sacrum in activity-restricted/ ankles in mobile	Significant swelling	Mild-to-moderate swelling	No sign of fluid accumulation

References: McCann L. Subjective global assessment as it pertains to the nutritional status of dialysis patients. *Dialysis & Transplantation.* 1996;25:190.

Lower limbs: Ankle edema

Measurement of Functions: Handgrip strength

Muscle strength is a good functional parameter with which to predict the outcome in both acute and chronic situations.

Impaired hand grip strength has been shown to be a good predictor of poorer clinical outcomes (e.g.increased length of hospitalization, higher re-hospitalization rates and decreased physical status).
it is an excellent predictor for short- and also long-term mortality.

Factors that may affecting HGS:
Age, Gender, Co-morbidities, Hand dominance, body position (posture), effort and encouragement, interval measure, time of the day, training of the assessor, number of assessment and summary measures reported.

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Original Research

Handgrip Strength as a Simple Indicator of Possible Malnutrition and Inflammation in Men and Women on Maintenance Hemodialysis

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Objective

To assess the validity of handgrip strength (HGS) as a simple screening instrument for malnutrition and inflammation in patients on maintenance hemodialysis (MHD) by correlating it with malnutrition-inflammation score (MIS).

Design

Cross-sectional analysis of the Prospective Study of the Prognosis in Chronic Hemodialysis Patients (PROHEMO).

Setting

Satellite dialysis units in the city of Salvador, Brazil.

Patients

The sample included 274 men and 162 women on MHD.

Main Predictor Variable

HGS was chosen as the main predictor variable in this study.

Main Outcome Measure

An MIS ≥6.

Results

As compared with men, women were found to have lower HGS values (19.38 ± 6.48 kg vs. 29.07 ± 8.67 kg; $P < .001$) and higher MIS (6.38 ± 3.84 vs. 5.57 ± 3.39; $P = .032$). HGS was found to be inversely correlated with MIS among women (Spearman's $\rho = -.360$; $P < .001$) as well as men (Spearman's $\rho = -0.384$; $P < .001$); this inverse correlation was observed in patients with and without diabetes, different racial groups, younger and older subjects, incident (<3 months) and prevalent patients, in the case of both genders. Among both men and women, every one standard deviation lower of HGS was associated with more than two-fold higher odds for MIS ≥6, after adjusting for age, race, duration of dialysis, and Kt/V. These associations remained statistically significant after more extensive adjustments. The optimized cutoff point of HGS for MIS ≥6 was 28.3 kg for men (sensitivity = 70.0%; specificity = 66.0%) and 23.4 kg for women (sensitivity = 87.0%; specificity = 43.0%).

Conclusions

Lower HGS values were independently associated with higher MIS among patients on MHD across several subgroups. These results suggest that HGS is a valid screening instrument for malnutrition and inflammation in patients on MHD.

The optimized cutoff point of HGS for MIS≥6 was 28.3kg for men and 23.4kg for Women in HD patients.

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Diagnostic accuracy of handgrip strength in the assessment of malnutrition in hemodialyzed patients

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SUMMARY

Background & aims: Parameters with diagnostic accuracy to malnutrition assessment may be a challenge for patients in hemodialysis (HD). Thus, the objective of this study was to verify the accuracy and cutoff of handgrip strength (HGS) in nutritional assessment.
Methods: Validation study of diagnostic tests. Cutoff to malnutrition was investigated by the ROC curves, using as reference standard the subjective global assessment (SGA), nutritional risk screening 2002 (NRS 2002) and malnutrition-inflammation score (MIS). The association of HGS with: phase angle (PA), body mass index, percentage of fat mass, fat-free mass (FFM), was verified by multiple linear regression, $P < 0.05$.
Results: 138 patients were evaluated (85 men), mean 55.4 ± 15.2 years. The area under the curve of the HGS showed moderate accuracy in women (SGA = 0.818; MIS = 0.834; NRS 2002 = 0.882) and low accuracy in men (SGA = 0.646; MIS = 0.606; NRS 2002 = 0.620). Cutoff values of HGS for the diagnosis of malnutrition, according to the reference standard were: <18 kg for women and <28.5 kg for men. The women classified as malnourished by HGS had lower values of PA ($\beta = -1.00$), FFM ($\beta = -3.15$) and MAC ($\beta = -2.80$), while malnourished men had lower values of FFM ($\beta = -4.35$), MAC ($\beta = -1.71$) and MAMC ($\beta = -1.28$).
Conclusion: HGS was accurate in the diagnosis of malnutrition in women in HD, and provided consistent results of association with most of the nutritional parameters, for both genders.

The cutoff of HGS for women was <18 kg, a value reported by SGA and MIS. The cutoff of HGS chosen for identifying men with malnutrition was <28.5kg in HD patients, as reported by MIS.

Abstract Poster - Kidney Care Conference 2019

DETERMINATION OF HANDGRIP STRENGTH (HGS) CUTOFF TO IDENTIFY MALNUTRITION IN HAEMODIALYSIS PATIENTS

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A total of 1694 haemodialysis patients were included in the study, which 57.1% were males, 56.6% were Chinese, and 72.4% were diabetics. The mean age was 60.0±11.0 years old. The median ESRD vintage was 102 days. The median HGS was significantly higher in males (18.0kg) than in females (8.0kg), $p<0.001$, while females had significant higher mean BMI (24.5±5.5kg/m^2) than that of males (24.0±4.4kg/m^2), $p<0.05$

Result:

The ROC curves shows that the AUC had good accuracy in women (AUC=0.716) and sufficient accuracy in men (AUC=0.658).

The HGS cutoff value to identify malnutrition defined by SGA were 10.5kg for females and 16.5kg for males in HD patients.

RESEARCH ARTICLE Open Access

Hand-grip strength among older adults in Singapore: a comparison with international norms and associative factors

Hui Lin Ong†, Edimansyah Abdin*†, Boon Yiang Chua, Yunjue Zhang, Esmond Seow, Janhavi Ajit Vaingankar, Siow Ann Chong and Mythily Subramaniam

Abstract

Background: Hand-grip strength (HGS) serves as a proxy measure for muscle function and physical health. Studies have shown that low HGS is associated with common age-related disorders including frailty and sarcopenia. The aim of the present study was to establish the normative values of HGS among older adults in Singapore and to compare it with data from Western and other Asian countries. The study also aimed to explore the sociodemographic and anthropometric correlates of HGS.

Methods: Data were collected from 2043 men and women aged 60 years and above who took part in the Well-being of the Singapore Elderly study in 2013. HGS was obtained using a Jamar Plus + digital hand dynamometer. Normative data were stratified by; 5-year age groups, sex and ethnicity. Relationships between the HGS with various sociodemographic and anthropometric correlates were examined using multiple linear regression analysis.

Results: The mean HGS demonstrate a decreasing trend with increased age across all ethnic groups and sexes. HGS among Singapore older adults were relatively low compared to Western and other Asian countries. Males in the youngest age group (60-64) and of Chinese ethnicity attained greater HGS values than their counterparts. When the regression analysis was stratified for sex, significant associations were found between height, upper arm circumference with HGS in the males sample, and between height, weight, waist circumference and HGS in the females sample.

Conclusions: Older adults in Singapore have a relatively weak HGS compared to other countries. Greater height and weight, and smaller waist circumference are independently associated with greater HGS in females but not males. These results facilitate the interpretation of HGS conducting using Jamar digital-type dynamometers among the older adults in Singapore.

Keywords: Anthropometry, Aging, Hand stren

The mean HGS for the males and females participants in the youngest age group (60-64years) was 31.1 kg and 18.2 kg respectively while it dropped to 18.5 kg for males and 12.4 kg for females participants in the oldest age group (85+ years).

The mean HGS showed a decreasing trend with increasing age among all three ethnic groups in both sexes.

Table 2 Means and standard deviations (SD) of hand-grip strength (kg) by age, sex and ethnicity groups

	Females					Males				
		Total	Chinese	Malay	Indian		Total	Chinese	Malay	Indian
Age group (years)	n	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	n	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
60–64	322	18.17(5.16)	18.58(4.78)	15.83(4.14)	18.01(4.82)	294	31.14(7.85)	31.24(7.63)	30.36(9.23)	28.97(6.83)
65–69	261	18.61(4.20)	18.93(3.98)	15.85(4.14)	17.06(4.58)	216	29.31(7.15)	29.80(7.24)	27.27(6.32)	27.37(6.76)
70–74	153	16.39(4.22)	16.61(4.61)	14.66(4.31)	16.26(4.90)	124	26.34(5.39)	26.36(5.44)	24.80(6.18)	24.07(6.33)
75–79	189	14.74(5.85)	15.29(5.65)	12.08(4.72)	13.38(4.59)	136	23.68(6.60)	23.80(6.16)	24.27(10.10)	22.57(6.76)
80–84	86	13.82(4.80)	14.12(4.74)	10.75(4.96)	12.68(4.78)	91	24.16(7.81)	24.27(6.34)	24.80(9.92)	23.77(7.79)
85+	83	12.36(5.47)	12.79(6.47)	10.34(6.60)	11.24(5.57)	88	18.46(13.77)	18.12(13.21)	18.97(12.47)	18.14(12.18)

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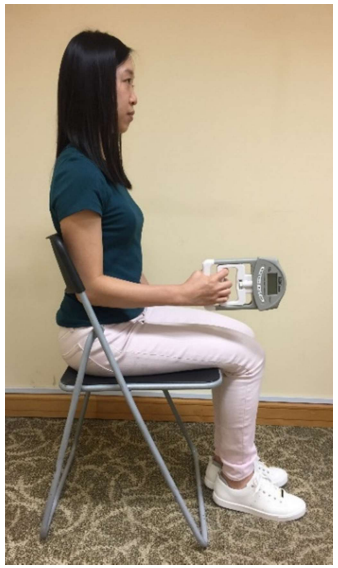
Handgrip strength assessment

Step (1): Administer the test on non-active vascular access hand or else dominant hand for those patients using perm catheters.

Step (2): Ask patient to stay in a seated position with hand in adduction and elbows flexed on a 90-degree angle. Patient starts to apply maximum strength after a verbal cue.
“Squeeze as hard as you can after I count till 3.” “Squeeze harder, harder… Relax”

Step (3): Perform 3 trials with intervals of at least 30 seconds between them. Record the measurements in the form. The maximum value of the 3 grip strength measurements of the hand will be used.



Summary

- A complete nutrition assessment is important to identify patients who are at risk / should consists of a combination of objective and subjective parameters, e.g. patient history (medical/ weight changes), physical examination, functional assessment, dietary adequacy and laboratory tests.

- The main goal is to identify patients at risk/ malnourished and to start timely and appropriate nutritional intervention.

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Thank you

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