

CHI Learning & Development (CHILD) System

Project Title

To Improve / Prevent Decline in Nutrition and Functional Status of Pre-Liver Transplant Patients While Awaiting Liver Transplant

Project Lead and Members

Project leads: Tan Hooi Yen, Wong Wei Yee

Project members: Valerie Goh, Dr. Eunice Tan, Diana Teh, Brenda Kok, Loh Yijun

Organisation(s) Involved

National University Hospital

Healthcare Family Group(s) Involved in this Project

Medical, Allied Health, Ancillary Care

Applicable Specialty or Discipline

Nutrition & Dietetics

Project Period

Start date: 2022

Completed date: 2022

Aims

- 1. To reduce the percentage of pre-LT patients having reduction in mid arm muscle circumference (MAMC)* at 6-month to< 20%.
- 2. To reduce the percentage of pre-LT patients having reduction in handgrip strength (HGS) at 6-month to < 15%.
- 3. To improve UCSF Liver Frailty Index** scores at 3-month and 6-month.



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Project Attachment

See poster attached/below

Background

See poster attached/below

Methods

See poster attached/below

Results

See poster attached/below

Conclusion

See poster attached/below

Project Category

Care & Process Redesign

Value Based Care, Functional Outcome

Care Continuum

Preventive Care, Patient Education

Keywords

Muscle Strength, Handgrip strength, Frailty, Malnutrition, Transplantation, Sarcopenia

Name and Email of Project Contact Person(s)

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Incredible Care QIX Award (Process Excellence)





Project Title: To improve / prevent decline in nutrition and functional status of pre-liver transplant patients while awaiting liver transplant

Department: Dietetics, NUCOT, Rehabilitation Period: 12 months Facilitators/Author: Dr Lim Su Lin, Dr. Lee Guan Huei

Sponsors (HODs): Lin Xianghui, Charlotte Team Leaders: Tan Hooi Yen, Wong Wei Yee (Dietetics)

Team Members: Valerie Goh (Dietetics), Dr. Eunice Tan (NUCOT), Diana Teh (NUCOT), Brenda Kok (NUCOT), Loh Yijun (Rehab)

A. Define the Problem (PLAN)

- This project aimed to improve/ prevent the decline of nutrition and functional status of chronic liver disease patients planned for liver transplant (LT).
- This group of patients are at heightened risk of malnutrition-related complications, leading to increased hospitalization, elevated infection rates and potential disqualification for transplantation.
- The progressive nature of liver diseases worsens malnutrition, impacting patient eligibility for transplantation.
- Studies in the recent years revealed sarcopenia and frailty in this group of patients correlated with a significant increase in the risk of LT waitlist mortality, decompensation, post-LT mortality and prolonged hospital stays. Therefore, reducing sarcopenia and frailty in this patient cohort is essential for improving pre-and post-LT outcomes.

D. Interventions & Action Plan (DO)

LT: Liver transplant

- About 58% of pre-LT patients had reduction in mid arm muscle circumference (MAMC) at 6month when compared to baseline.
- There were 36 % pre-LT patients had reduction in handgrip strength (HGS) at 6-month despite standard nutrition intervention.
- There is 70% of pre-LT patients categorized as frail and pre-frail

B. Goal (PLAN) Set SMART goals | Specific, Measurable, Achievable, Relevant, Time-based |

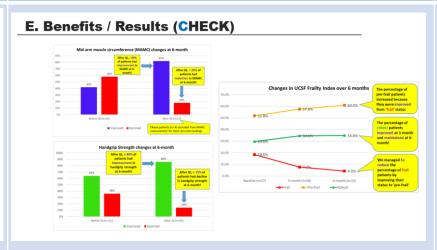
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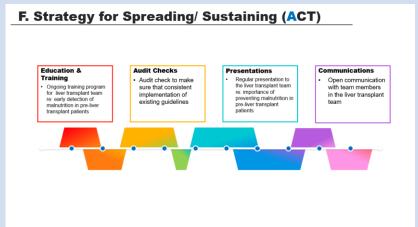
*MAMC is an inexpensive and practical anthropometric measure used in clinical practice to determine muscle mass.

**UCSF Frailty Index (University of California San Francisco Frailty Index) is a tool to measure frailty in liver patients and used to predict mortality of patients on waiting list.

C. Problem Analysis (PLAN) Gap Analysis Limited resources and time Insufficient resources dedicated to follow-up procedures Insufficient collaboration with B. No pre-op nutrition the transplant team for holistic 3. Absence of clear protocols for referral for LDL1 1. Dietitian Follow Lack of clear criteria for dietit Limited active 4. Lack of communication Lack of standardized trition monitoring and evaluation Inconsistent malnutrition awarenes malnutrition and nutrition practices among doct nctional status in pre-LT 6. Lack of awareness on importance of nutrition on pre-&post LT Low salt diet decreases 7. Limited knowled oor low sodium diet Severity of Lack of guidance on DDLT: Deceased donor liver transplant LDLT: Living donor liver transpla

	Di interventione a Action i fair (DC)						
Root cause	Description	People responsible	Date of implementation				
1	To develop a dietitian follow-up protocol of pre-LT patients after initial nutrition assessment (refer to Appendix A)	Hooi Yen, Wei Yee	June 2022				
2	3-Minute Nutrition Screening (3-MinNS) is conducted for all pre-LT patients attending NUCOT to flag out malnourished patients or at risk of malnutrition for an earlier dietitian review (refer to Appendix B)	Diana <u>Teh</u> , Brenda <u>Kok</u>	Aug 2022				
3	To develop a nutrition management protocol for pre-LT patients (Appendix C)	Hooi Yen	July 2022				
4	To attend Liver Transplant Meeting weekly with the transplant team (HPB surgeons, Hooi Yen, Dr Eunice hepatologists, liver coordinators, and other allied health members)		Sept 2022				
5	To proactively identify patients with poor functional status and ensure timely referral to physiotherapist for appropriate intervention		Aug 2022				
6	To enhance patient's awareness on importance of adequate nutrition with broadcasting educational videos showcasing healthy recipe demonstrations on NUCOT clinic television screen.	<u>Hooi</u> Yen, Wei Yee, Valerie Goh	Sept 2022				
7	To place posters on low sodium food choices when eating out and tips to reduce sodium intake in the dietitian's consult room	Valerie Goh, <u>Hooi</u> Yen, Wei Yee	Aug 2022				
8	To implement a process whereby liver coordinators promptly notify dietitian of planned living donor liver transplants. Ensure timely dietitian referral one month pre-op for pre-surgery nutrition optimization.	Liver coordinators and dietitians	Aug 2022				



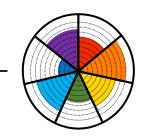


The 6 box QIX template is brought to you by Quality Improvement Department wef 1 April 2023

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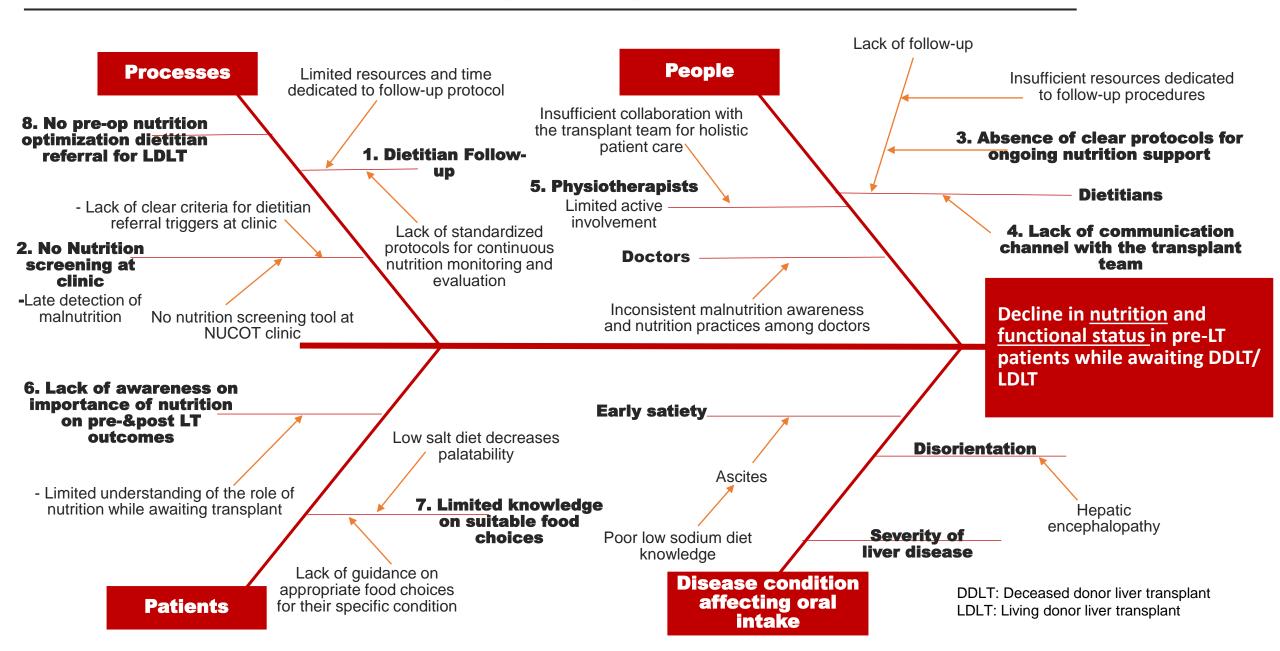


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C. Problem Analysis (PLAN) Gap Analysis

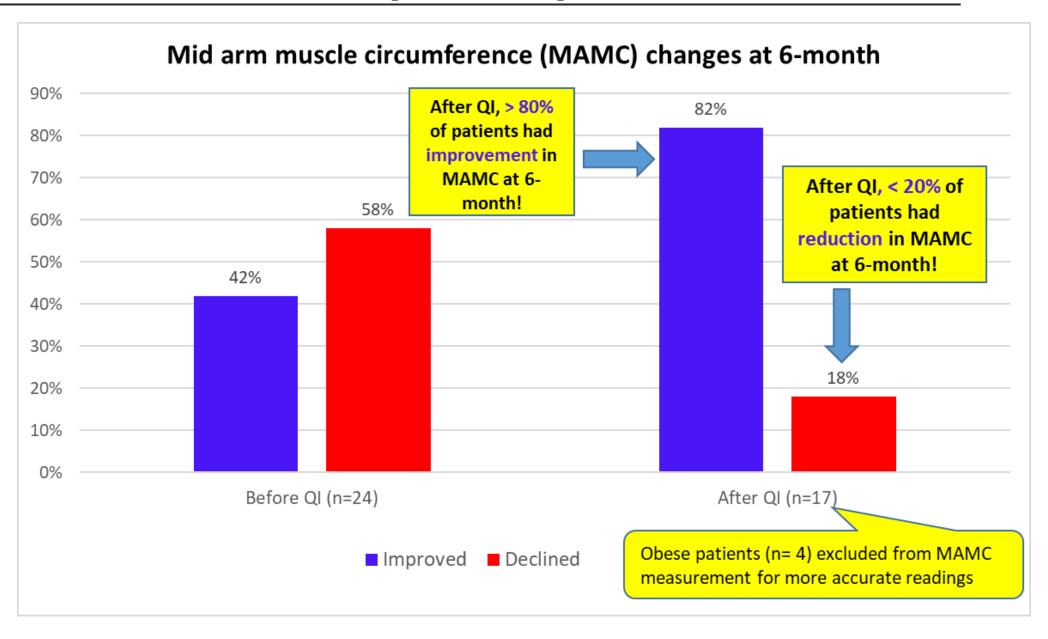


D. Interventions & Action Plan (DO)

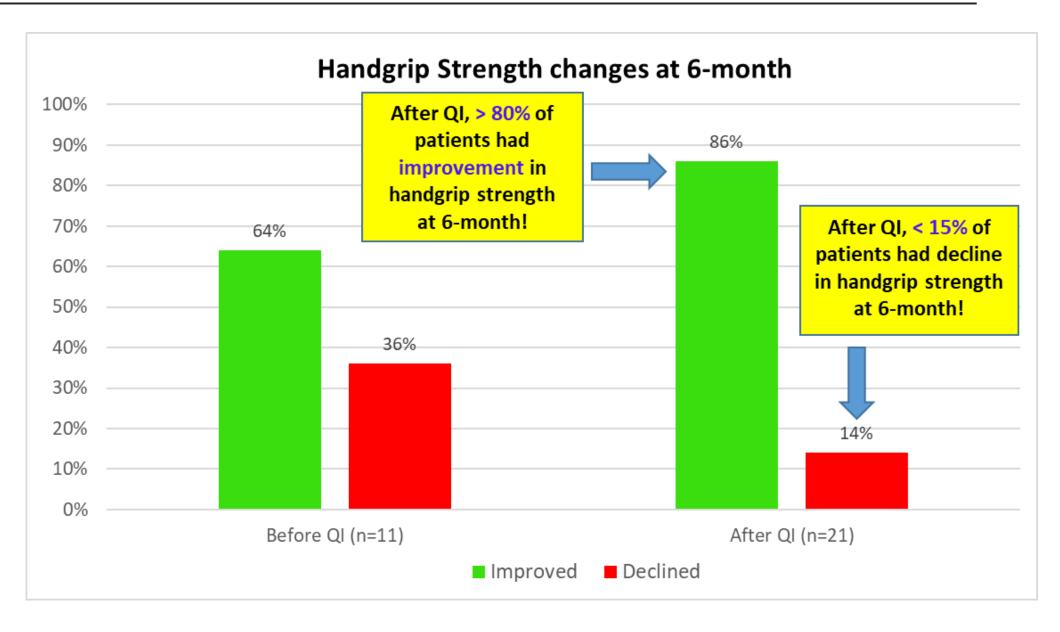
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LT: Liver transplant

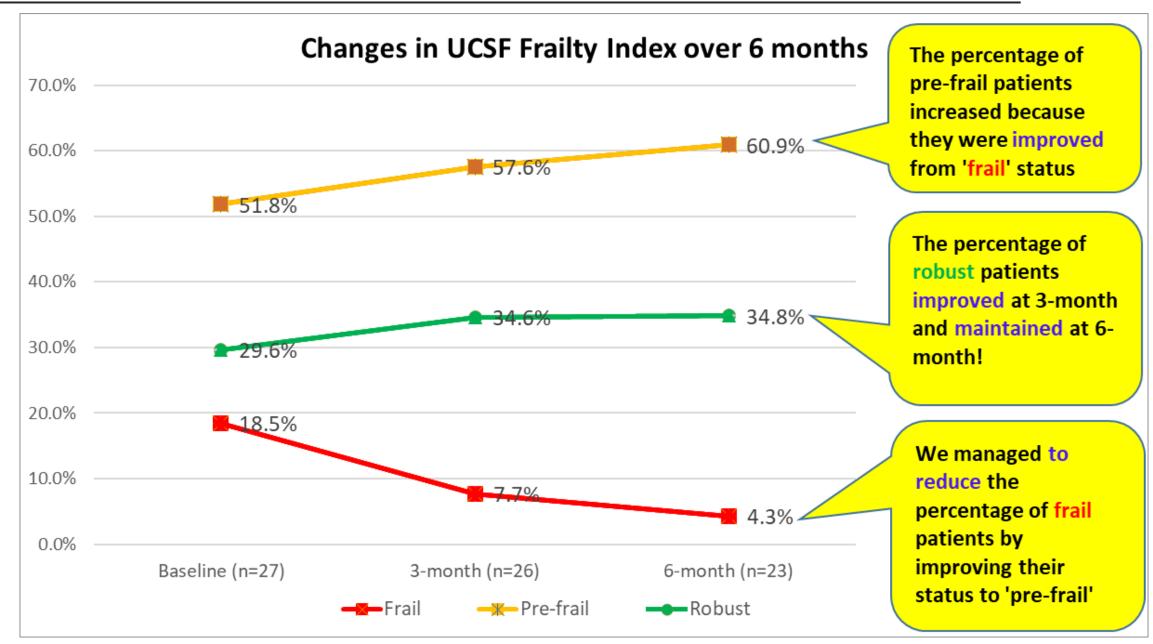
E. Benefits / Results (CHECK)



E. Benefits / Results (CHECK) (continued)



E. Benefits / Results (CHECK) (continued)



F. Strategy for Spreading/ Sustaining (ACT)

Education & Training

 Ongoing training program for liver transplant team re: early detection of malnutrition in pre-liver transplant patients

Audit Checks

 Audit check to make sure that consistent implementation of existing guidelines

Presentations

 Regular presentation to the liver transplant team re: importance of preventing malnutrition in pre-liver transplant patients

Communications

 Open communication with team members in the liver transplant team

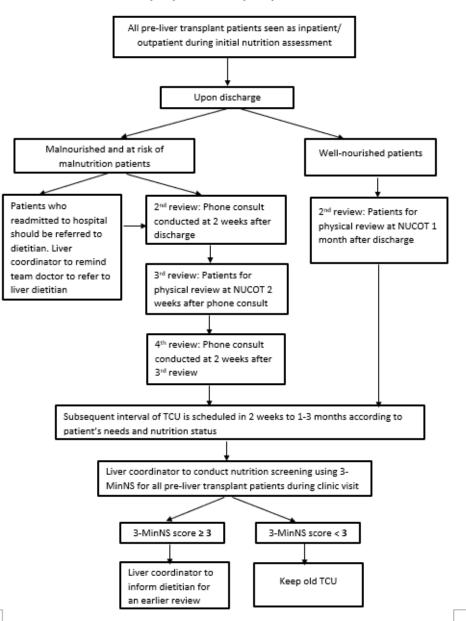


Appendix A:

Workflow of following-up with pre-liver transplant patients at NUCOT



Protocol for dietitian follow-up of pre-liver transplant patients



3-MinNS: 3-Minute Nutrition Screening

3-Minute Nutrition Screening (3-MinNS)

Appendix B:

3-Minute Nutrition Screening Tool

This screening tool has been used in NUH inpatients since 2009 and in selected outpatient clinics since 2017

3-Minute Nutrition Screening (3-MinNS)					
	Nutrition Indicators				
	Unintentional	Oral Intake	Muscle Wastage		
	Weight Loss (Past 6 Mths)	(Past 1 Week)	Muscle From Temple	Clavicle Bone	
3	□ > 7kg	☐ Starvation or < ¼ share of usual portion per meal	☐ Hollowing, Depression of Temple Muscle	☐ Protruding & Prominent Clavicle Bone	
3		□ Tube Feeding < 1 L/day (1kcal/ml feed) <1000kcal/day			
2	□ >3 to 7 kg □ Yes, unsure	☐ ¼ - <½ share of usual portion per meal	☐ Slight Depression of Temple Muscle	☐ Slight Protrusion of Clavicle Bone	
2		☐ Tube Feeding 1 – 1.25 L/day (1 kcal/ml feed) 1000 – 1250 kcal/day			
	□ 1 to 3 kg	☐ ½ - <¾ share of usual portion per meal			
1	□ Don't know	☐ 1/4 - <1/2 share of usual portion per meal with oral supplement			
		☐ Tube Feeding >1.25 – 1.5 L/day (1 kcal/ml feed) >1250 – 1500 kcal/day			
0	☐ No change/ Weight gain/ Intentional weight	□ Normal intake with ¾ - 1 share of usual portion per meal	☐ Well Defined Muscle	☐ No Protruding Clavicle Bone	
	□ < 1kg	☐ Tube Feeding > 1.5 L/day (1 kcal/ml feed) >1500 kcal/day			
Scoring (Circle one per column)	3 2 1 0	3 2 1 0	3 2	1 0	
Total Score		□ Referral to Dietitian if Total Score is <u>3 or more</u>			

Appendix C:

Nutrition Management Protocol for Pre-liver Transplant Patients



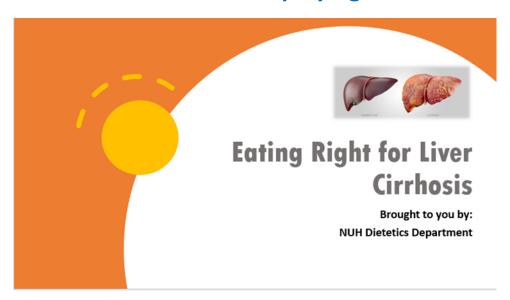
NUH Dietetics Nutrition Management Protocol for Pre-liver Transplant Patients 2022

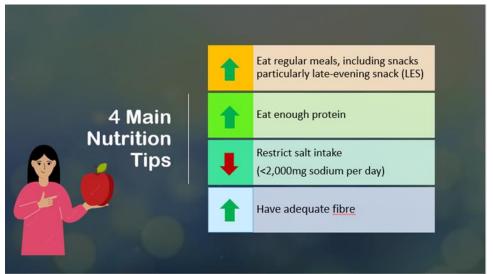
(Adapted from EASL Clinical Practice Guidelines 2019) Liver cirrhosis /Advanced liver chronic disease Child -Pugh Score Child C Child A or B < 20 kg/m^{2 1} BMI 1 ≥30 kg/m² Underweight (use estimated dry weight Obese if ascites/edema present) *<18.5kg/m2 if based on EASL Guidelines⁴ 20-29.9 kg/m² Refer to liver specialized dietitians for detailed nutrition assessment: -7 points Subjective Global Assessment (as used High risk of in our hospital) -Mid-arm muscle circumference (MAC) except malnutrition for BMI ≥30 kg/m² and Handgrip strength -Reported dietary intake Malnourished with SGA score 1-5: Well-nourished with SGA 6-7 and Well-nourished with SGA 6-7 and Energy2: 35-40kcal/kg BW BMI 20-29.9; BMI ≥ 30; Protein2: 1.2-1.5g/kg BW Energy2: 35-40kcal/kg BW* Energy2: Late evening snack 2, 4, 5 Protein2: 1.2-1.5g/kg BW* BMI 30-40: 25-35kcal/kg BW* Oral nutrition supplement 2,4 BMI >40: 20-25kcal/kg BW* *use ideal BW at BMI 25 if BMI >25 Small and frequent meals2,4 -Promote vegetable and dairy protein for Protein2: 1.0-1.5g/kg BW* Low sodium diet (<2000mg Na/day)3 weight loss 2 *use ideal BW at BMI 25 if BMI ≥ 30 Consider BCAA supplement (for recurrent Late evening snack 2, 4, 5 -Promote vegetable and dairy protein HE or sarcopenic patient) 2,4 Small and frequent meals^{2, 4} for weight loss 2 Dietary fiber: 25-45g/day 2 Low sodium diet (<2000mg Na/day)3 Low sodium diet (<2000mg Na/day) 3 Consider enteral nutrition with NGT if Dietary fiber: 25-45g (especially Dietary fiber: 25-45g (especially severely malnourished or poor oral overweight) 2 overweight) 2 intake > 7-10 days 5,7 Late evening snack if HE 2, 7 **Encourage Exercise** Inpatient: appropriate follow up at least 2-3 times per week Inpatient: appropriate follow up at least weekly Outpatient: follow up at least every 2 Outpatient: follow up every 1 months; if no risk of malnutrition, weeks to 1 month follow up in 1-3 months

Repeat assessment every 1-3 months

Repeat assessment in 1 month

Powerpoint presentation on 'Eating Right for Liver Cirrhosis' playing at NUCOT





Low sodium diet poster display in consult room





Healthy menu cooking video clips playing at NUCOT









