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.

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)

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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.
- About 58% of pre-LT patients had reduction in mid arm muscle circumference (MAMC) at 6-month 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.

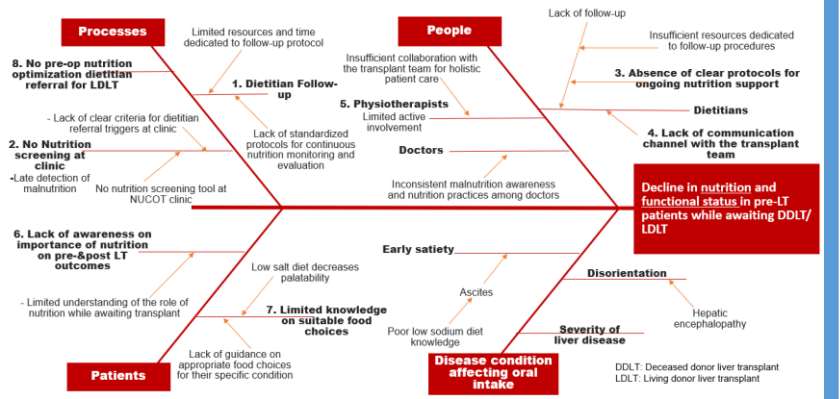
LT: Liver transplant

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

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.

*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

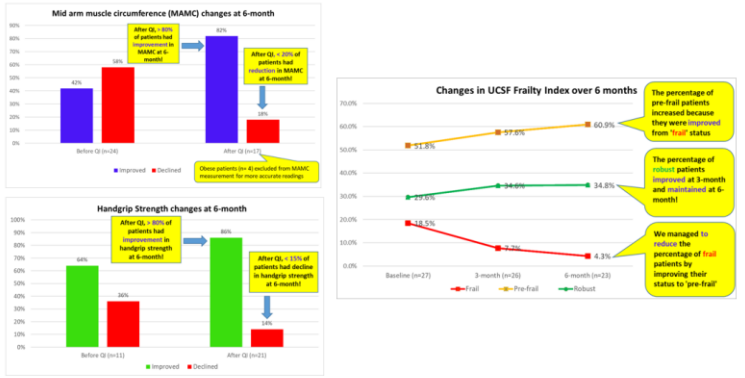


D. Interventions & Action Plan (DO)

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 Teh, Brenda Kok	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, hepatologists, liver coordinators, and other allied health members)	Hooi Yen, Dr Eunice	Sept 2022
5	To proactively identify patients with poor functional status and ensure timely referral to physiotherapist for appropriate intervention	Dietitians, Yijun	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.	Hooi 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, Hooi 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

LT: Liver transplant

E. Benefits / Results (CHECK)



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

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

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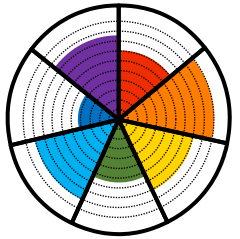

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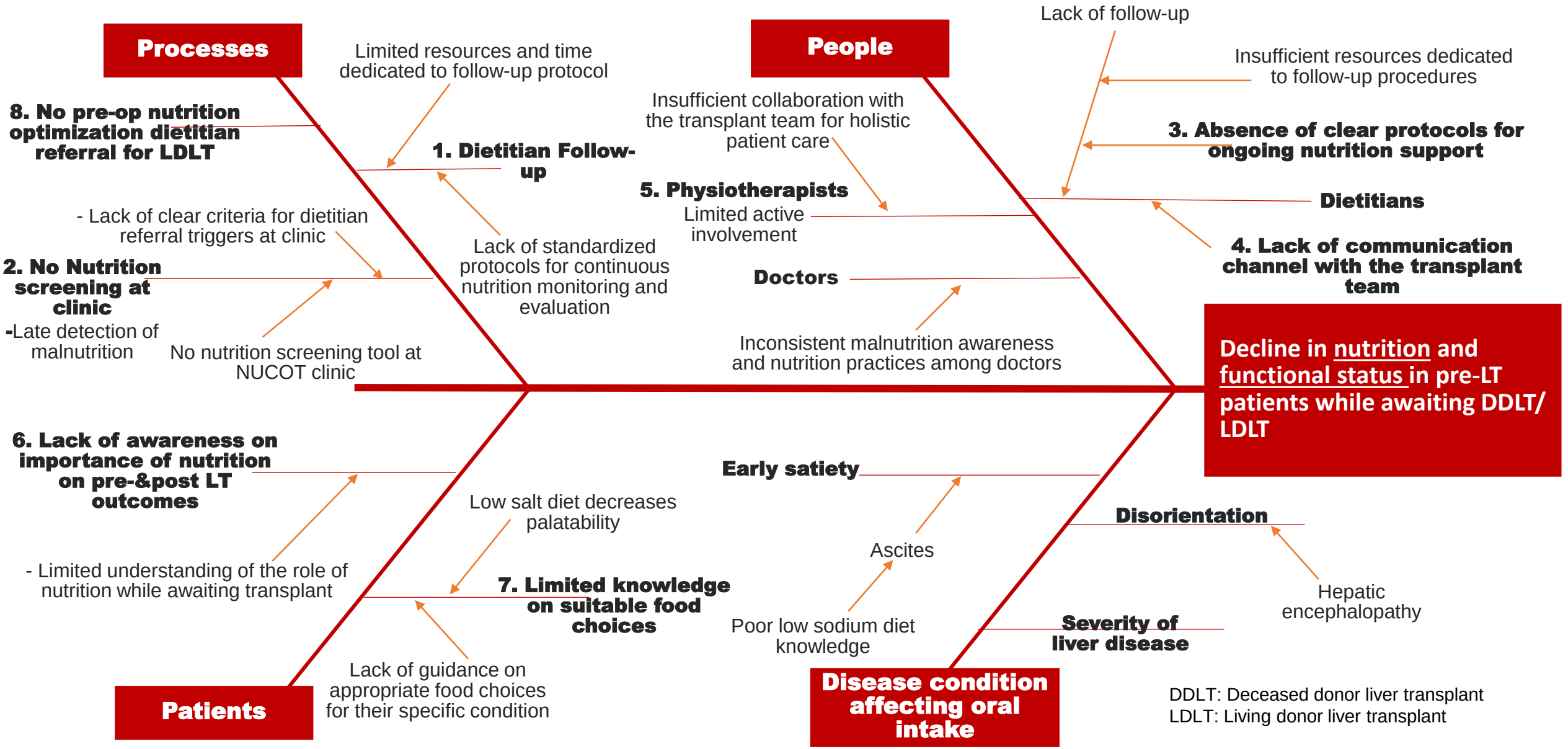

DDLT: Deceased donor liver transplant
LDLT: Living donor liver transplant

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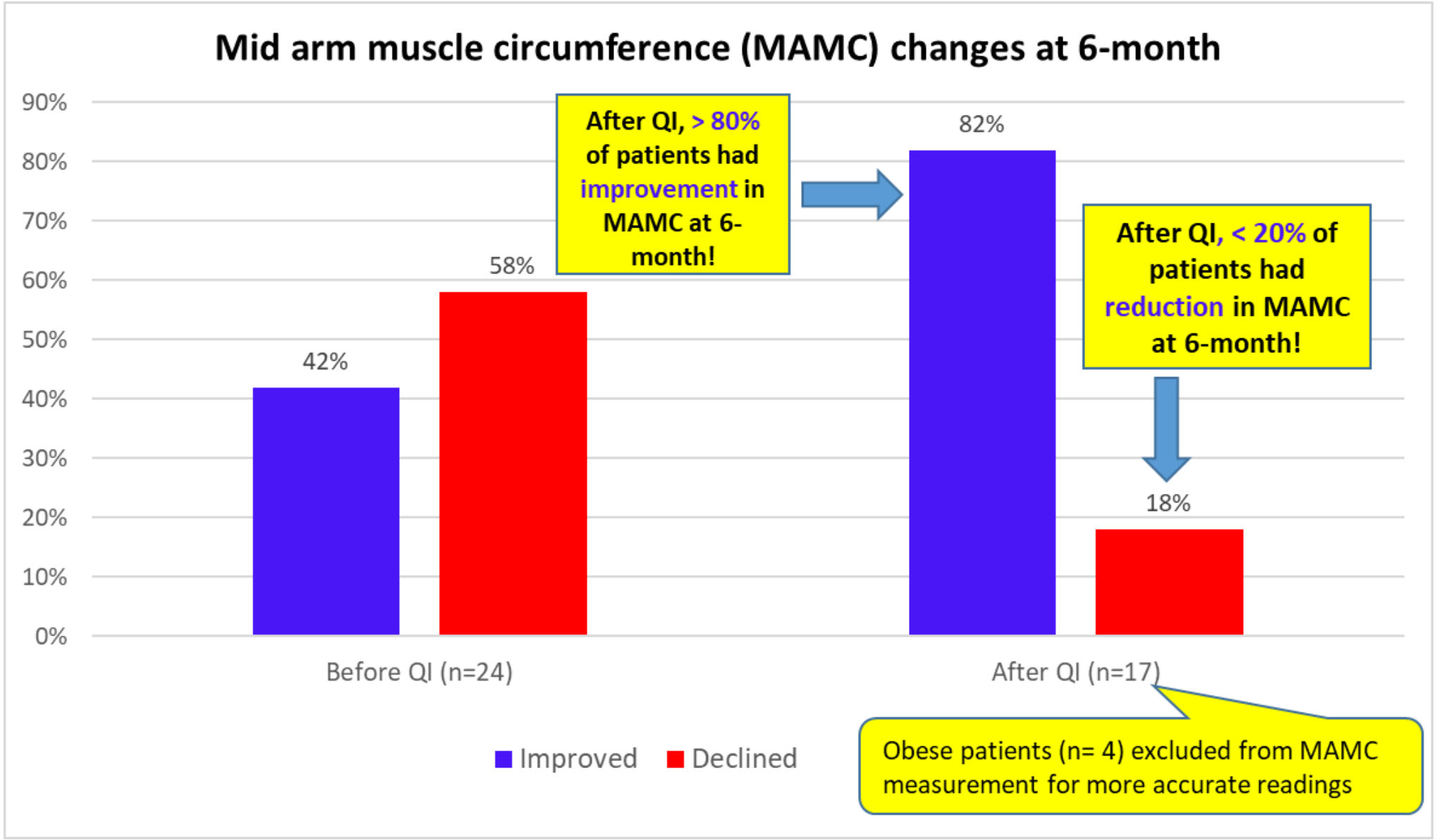
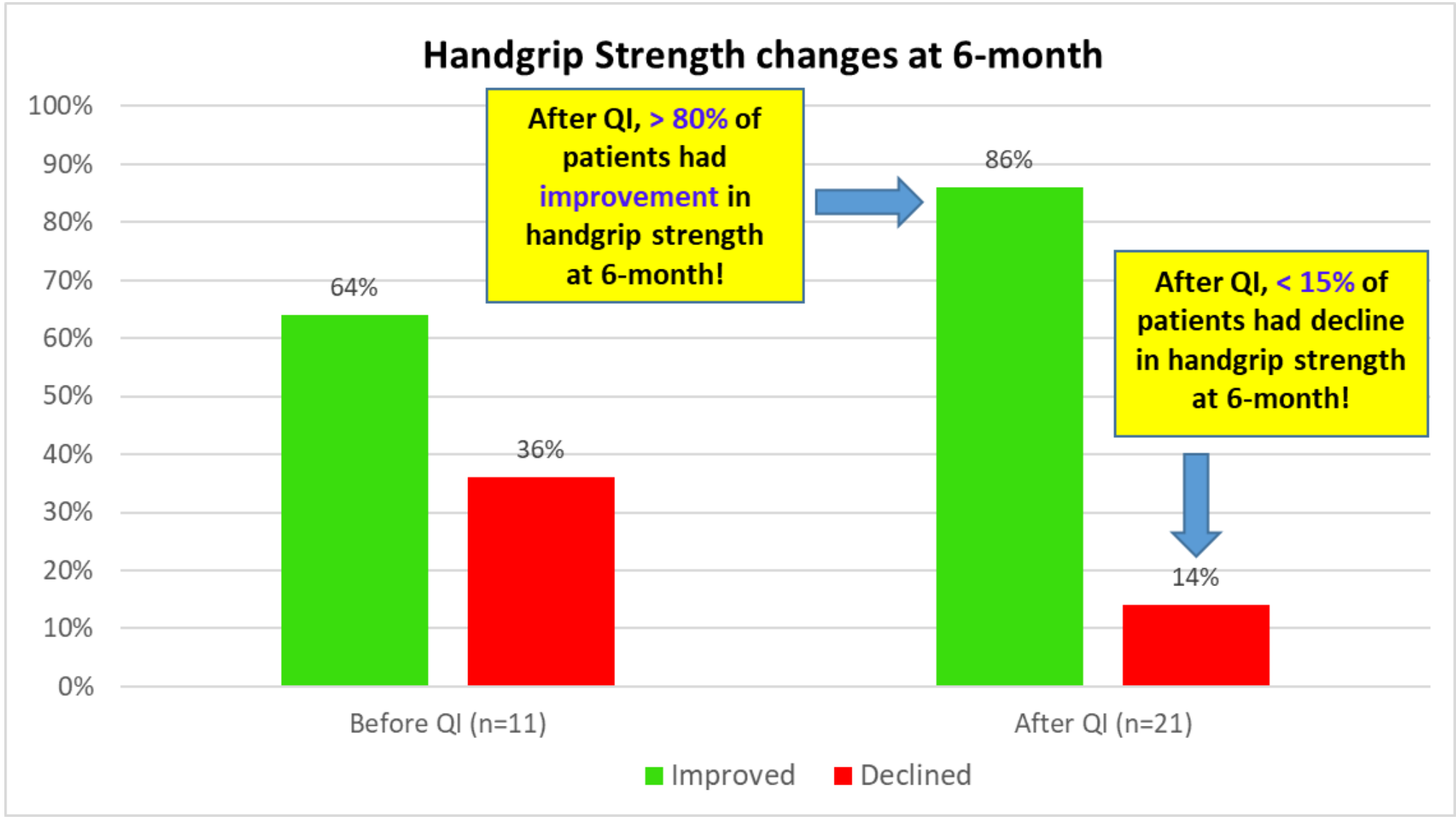
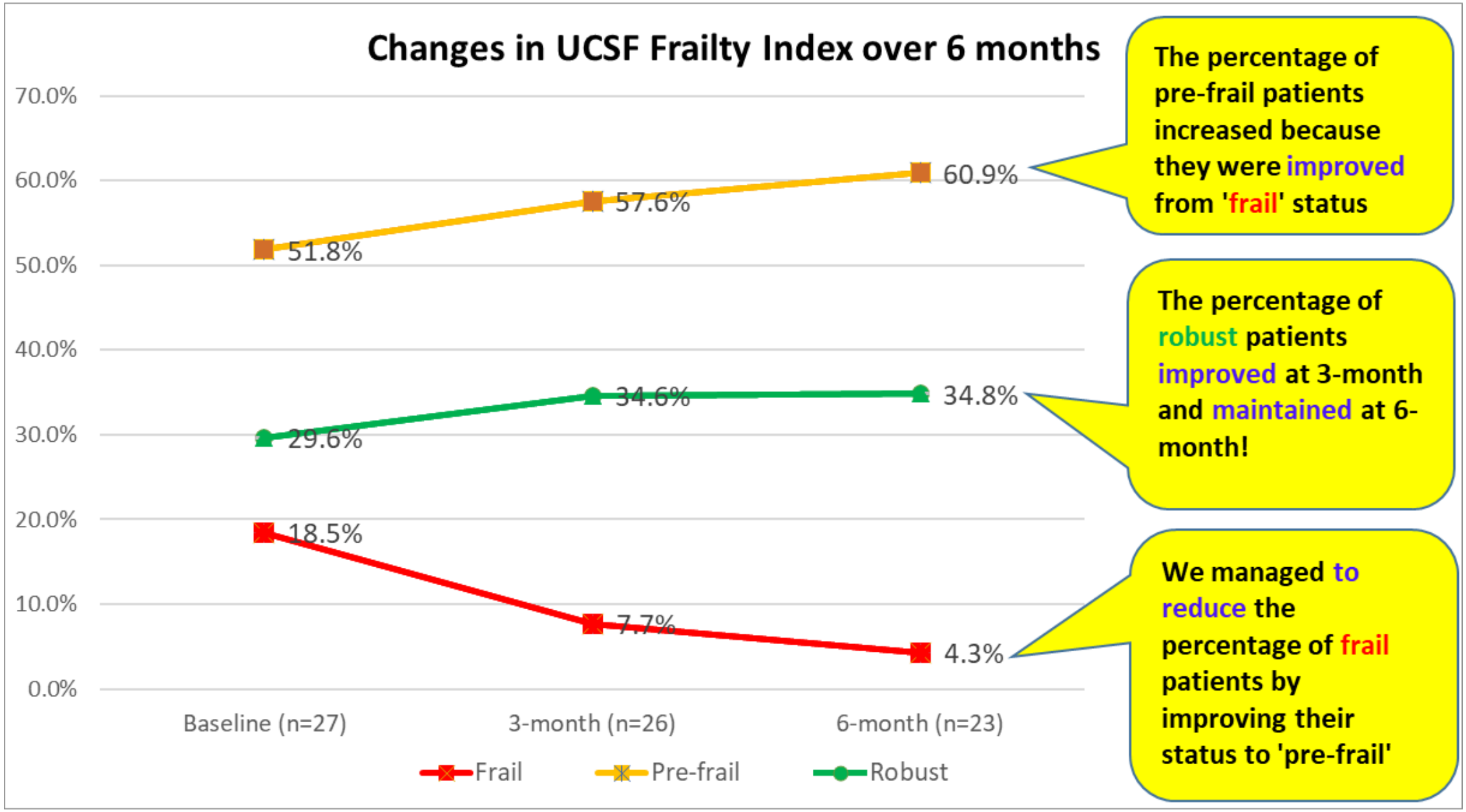


E. Benefits / Results (CHECK) (continued)



E. Benefits / Results (CHECK) (continued)



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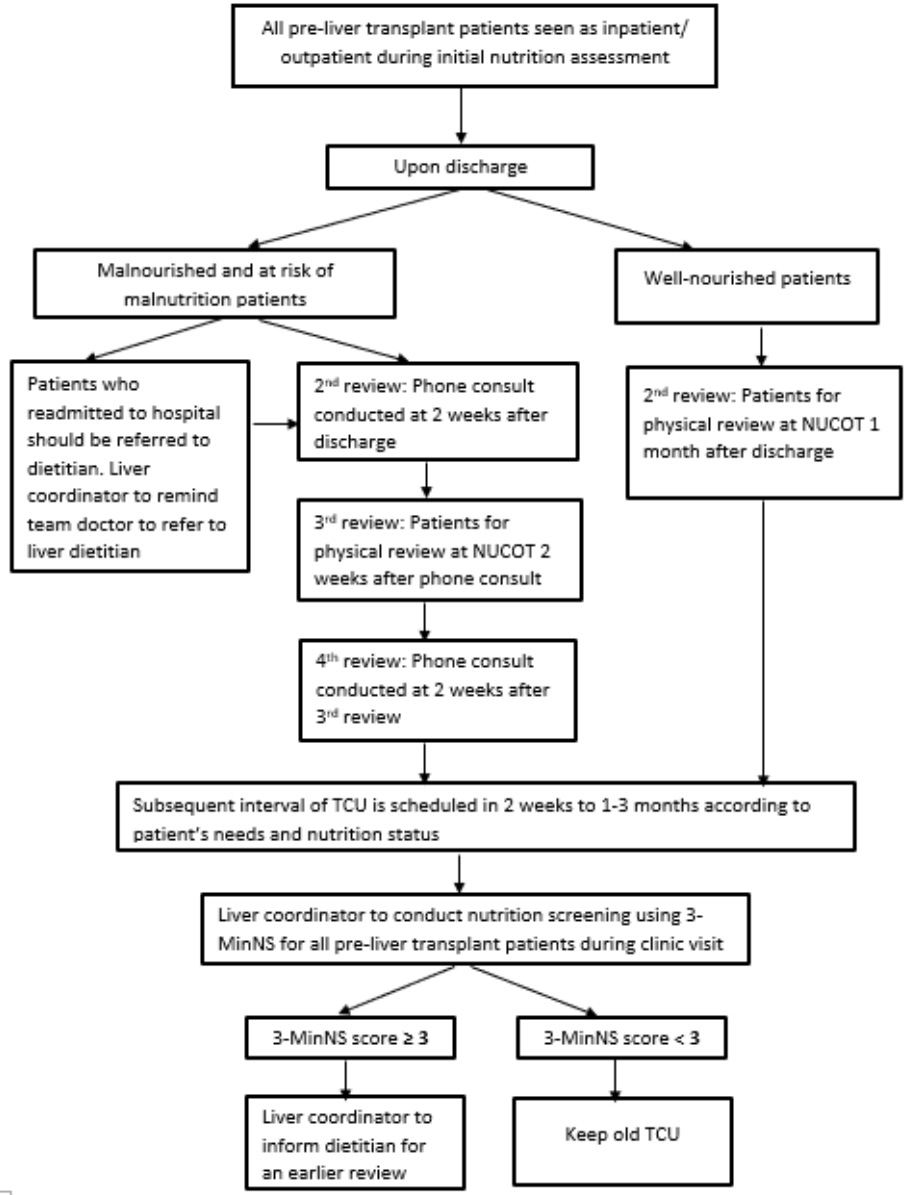
Appendix

Appendix A:

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

National University Hospital

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



3-MinNS: 3-Minute Nutrition Screening

Created in July 2022 by Tan Hooi Yen & Wong Wei Yee

Appendix

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)

3-Minute Nutrition Screening (3-MinNS)				
	Nutrition Indicators			
	Unintentional Weight Loss (Past 6 Mths)	Oral Intake (Past 1 Week)	Muscle Wastage	
			Muscle From Temple	Clavicle Bone
3	☐ > 7kg	☐ Starvation or < ¼ share of usual portion per meal ☐ Tube Feeding < 1 L/day (1kcal/ml feed) <1000kcal/day	☐ Hollowing, Depression of Temple Muscle	☐ Protruding & Prominent Clavicle Bone
2	☐ >3 to 7 kg ☐ Yes, unsure	☐ ¼ - <½ share of usual portion per meal ☐ Tube Feeding 1 – 1.25 L/day (1 kcal/ml feed) 1000 – 1250 kcal/day	☐ Slight Depression of Temple Muscle	☐ Slight Protrusion of Clavicle Bone
1	☐ 1 to 3 kg ☐ Don't know	☐ ½ - <¾ share of usual portion per meal ☐ ¼ - <½ 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 loss ☐ < 1kg	☐ Normal intake with ¾ - 1 share of usual portion per meal ☐ Tube Feeding > 1.5 L/day (1 kcal/ml feed) >1500 kcal/day	☐ Well Defined Muscle	☐ No Protruding Clavicle Bone
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 **3 or more**		

Lim SL, Tong CY, Ang E, Lee EJ, Loke WC, Chen Y, Ferguson M, Daniels L. Development and validation of 3-Minute Nutrition Screening (3-MinNS) tool for acute hospital patients in Singapore. Asia Pac J Clin Nutr. 2009;18(3):395-403.

Appendix

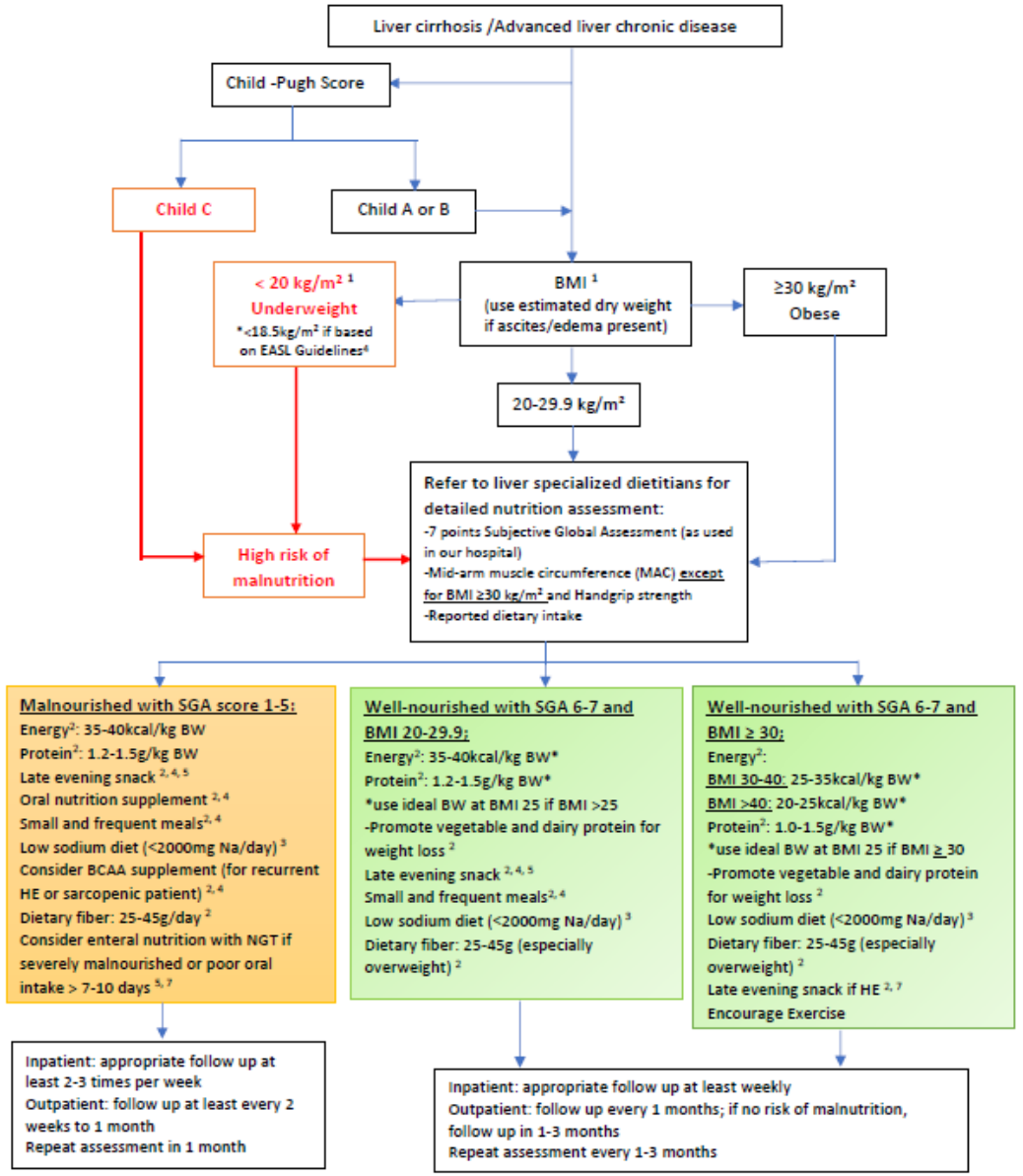
Appendix C:

Nutrition Management Protocol for Pre-liver Transplant Patients

National University Hospital

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

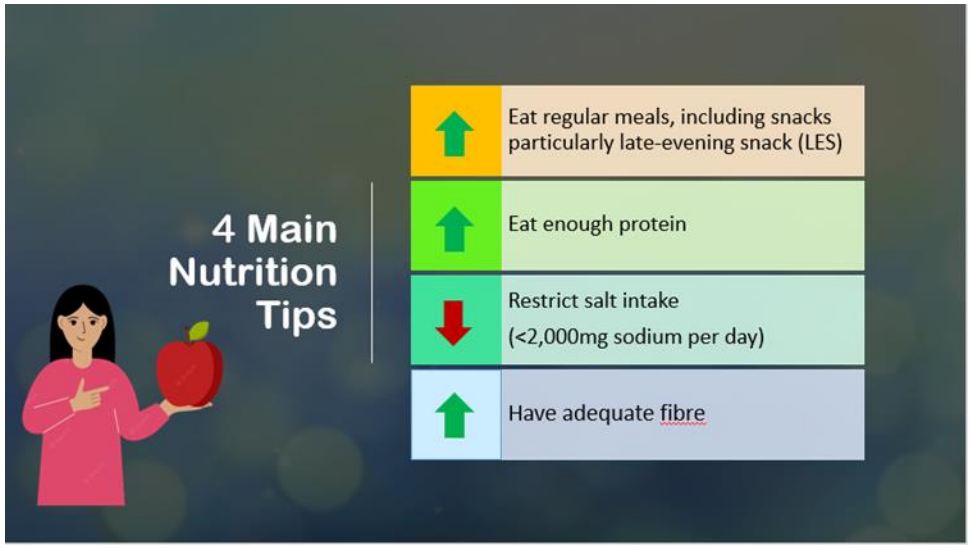
(Adapted from EASL Clinical Practice Guidelines 2019)



Prepared by Tan HY, July 2022

Appendix

Powerpoint presentation on ‘Eating Right for Liver Cirrhosis’ playing at NUCOT



Low sodium diet poster display in consult room

Appendix

Healthy menu cooking video clips playing at NUCOT