



**OPTIMIZING TELENUTRITION COUNSELING FOR PERSONS WITH  
CHRONIC TRAUMATIC SPINAL CORD INJURY USING RELEVANT  
BASELINE DATA**

**Presenter: Ramya Gopalan**

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DISCLOSURES

**NONE TO REPORT**

# LEARNING OBJECTIVES

- **Objective 1:** To discuss the challenges in nutritional intervention adherence after spinal cord injury.
- **Objective 2:** To list key dietary considerations in nutritional counseling and education.
- **Objective 3:** To demonstrate the organization of baseline data to optimize nutritional counseling

BACKGROUND

# NUTRITION AND CVD RISK AFTER SCI : **WHAT WE KNOW**

Physical and Physiological changes after SCI



Metabolic Abnormalities/body comp alterations



Shifts in Energy balance/Neurogenic obesity



Increased CMD and CVD risks for morbidity and mortality



Inactivity and uncontrolled diets can exacerbate CMD risks.

## SCI: Evidence from literature:

Increased CMD/CVD/obesity rates after SCI

Energy needs compromised after injury

Poor diets characterized by high fat (SF), Poor fiber and micronutrient/food group recommendations noted in SCI population groups

Nutrition interventions beneficial in mitigating CVD risks

## DIETARY INTERVENTION AND CVD RISK AFTER SCI: **WHAT WE STILL NEED TO KNOW**

“A systematic review of the effect of dietary interventions on CVD risk in adults with SCI” (Iyer et al.; JSCM, 2021)

- ❖ Studies lacking rigor and robust data collection
- ❖ Pre-existing nutrition knowledge and behaviors missing
- ❖ No systematic exploration factors contributing to dietary adherence
- ❖ NI strategies varied widely between studies

“Towards effective dietary Counseling: a scoping review” (Barkmeijer et al., 2022)

- Multi Strategic approaches needed for effective dietary counseling:
- Tracking both effective and ineffective strategies building an organized model for effective counseling



# DIETITIAN'S ROLE IN EFFECTIVE COUNSELING

- ✓ Comprehensive pre-intervention assessments of diet/health/weight status and other personal/pre-existing conditions → individual needs/risk factors and planning of customized NI goals
  - ✓ Systematic tracking and monitoring the efficacy of NI from ongoing sessions → recurring customized feedback to participants as well as build self-efficacy in delivering DC
- 
- Robust data exploration, rigorous data collection and organized documentation procedures for gaining important dietary insights
  - **Time limiting factor**
  - There are no standardized processes or tools available for streamlining and cutting down time burden for the dietitian so NI sessions can be best optimized

# OBJECTIVE

**To design a standardized 2-component tool to optimize Nutritional Intervention (NI) in a clinical trial**

I. Developing a relevant summary report on pre-existing health, and nutritional assessments using available baseline data (BD)

2. Creating an organized template for note-taking from ongoing sessions



# OBJECTIVE

**To design a standardized 2-component tool to optimize Nutritional Intervention (NI) in a clinical trial**

- Save time for SD
- Organized tracking of key insights on NI
- Personalized counseling and recurring feedback

# METHODS



# STUDY INTERVENTION DETAILS

**Clinical trial:** Telenutrition to Improve Cardiometabolic Health and Quality of Life among individuals with Spinal Cord Injury (*funding:* NIDILRR grant number: 90SIMS0006-01-00)

**Intervention:** Nutrition counseling for 3 months involving 6 biweekly sessions using iPad via facetime

**2791 Telerehabilitation: Bringing Care for Persons with Spinal Cord Injury**

- Shelley Wood, MPH, RDN

Sep 5, 2023  
3:00 PM – 3:30 PM

## METHODS: STREAMLINING THE PREPARATION PROCESSES

1. Exploring all available data output elements from varied sources collected from baseline visit.

1. EXPLORING  
DATA OUTPUT  
ELEMENTS

2. TEAM  
DISCUSSIONS  
ON SELECTING  
VARIABLES

3. TEMPLATE  
DESIGN

4. TESTING THE  
TOOL-manual  
collation

5. Automated  
collation of data  
using MATLAB  
script

# I. EXPLORING DATA OUTPUT ELEMENTS

2. TEAM DISCUSSIONS ON SELECTING VARIABLES

3. TEMPLATE DESIGN

4. TESTING THE TOOL-manual collation

5. Automated collation of data using MATLAB script

# METHODS: STREAMLINING THE PREPARATION PROCESSES

Data outputs	Description	Source/storage
Dietary data (ASA_24Hr_Recall data)	Multiple, automatically coded, self-administered 24-hour diet recalls outputted as nutrition and food group data files	ASA_data portal- downloaded into local study folder as 6 sets of distinct data files (upto 130 data outputs/file)
Blood labs	Blood lipids, HbA1C, HS-CRP, Vitamin D	Abstracted from Medical Records into ACCESS
Demographic	Age, Race, ethnicity,	Baseline surveys/ACCESS
Injury characteristics	DOI, LOI, completeness	Baseline surveys/ACCESS
Anthropometric	weight, height, waist and hip circumferences	Baseline assessments/ACCESS
Body composition (using BIA)	Body composition measures	Baseline assessments-exported as EXCEL files

EXPLORING  
DATA OUTPUT  
ELEMENTS

**TEAM  
DISCUSSIONS  
ON SELECTING  
VARIABLES**

3. TEMPLATE  
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## METHODS: STREAMLINING THE PREPARATION PROCESSES

2. Team discussions to select variables for personalizing the NI sessions:

- What BD will be helpful in personalizing the NI strategies ?
- How should the data be effectively captured for easy reference/visualization
  - ✓ study needs/goals
  - ✓ scientific relevance
  - ✓ RDN preference
  - ✓ New insights from topics emerging from ongoing sessions\*

\* Based on first set of 5 participant notes

1. EXPLORING  
DATA OUTPUT  
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**3. TEMPLATE  
DESIGN**

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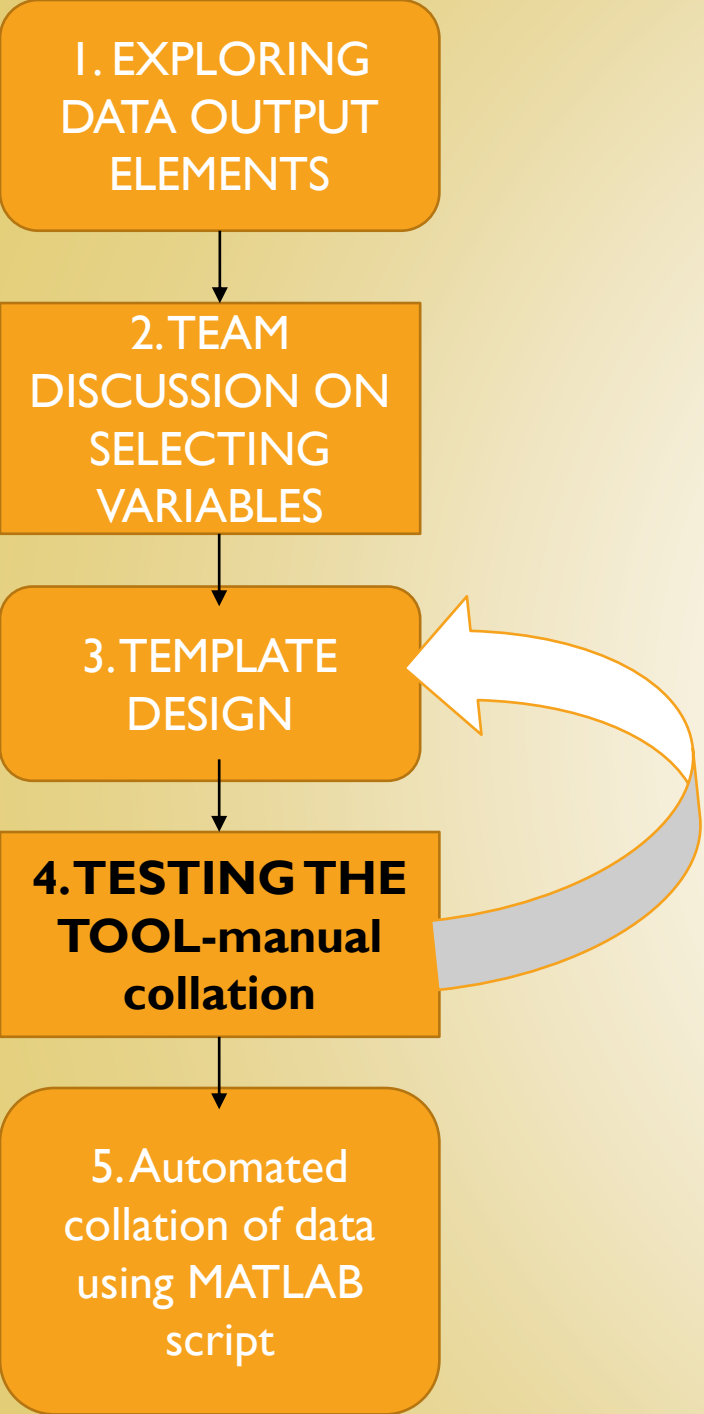
## METHODS: STREAMLINING THE PREPARATION PROCESSES

3. Creating a template design in Excel :

1. **Select pre-intervention data elements** (summarized from BD)
2. **Note-taking template** (to document insights from ongoing sessions)

- ✓ Easy visualization
- ✓ Ready accessibility
- ✓ Convenient navigation

# METHODS: STREAMLINING THE PREPARATION PROCESSES



## 4. Testing the tool:

- Building a report by manually entering pertinent BD into the designed template
- Feedback from SD:
  - Was the report/template helpful?
  - Any additional piece be added?
  - Extraneous data to be deleted?
  - Approve visual presentation?
  - Easy to use and navigate?



1. EXPLORING  
DATA OUTPUT  
ELEMENTS

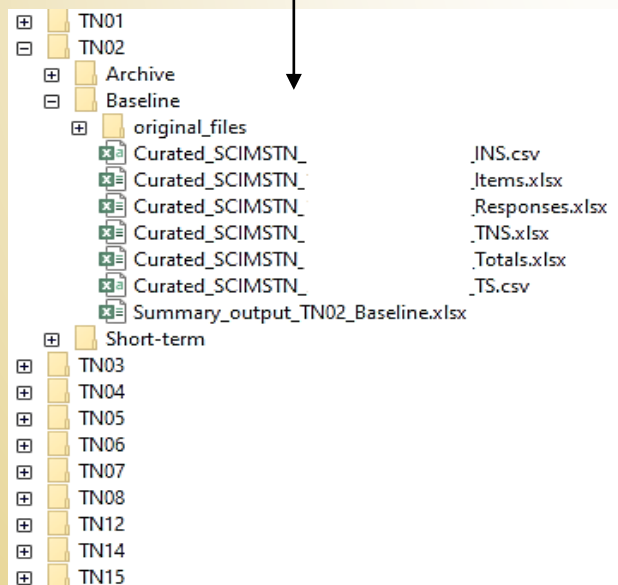
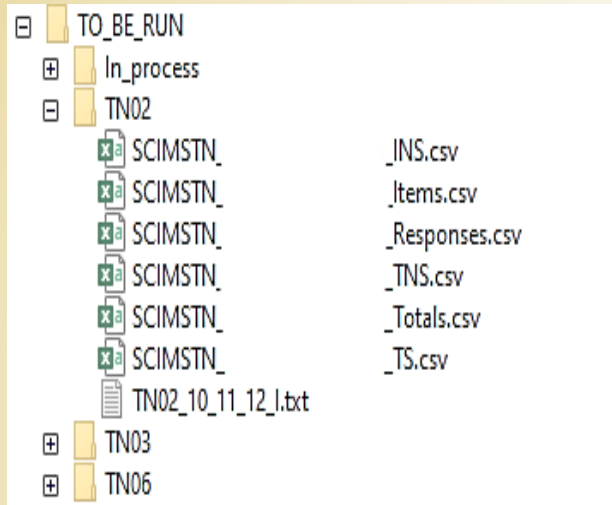
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script

## METHODS: STREAMLINING THE PREPARATION PROCESSES



5. Automatic collation using a Matlab (R2020b) script:

➤ To automatically merge the siloed BD into the NI template

➤ To readily organize the summary output files into participant-specific folders

# RESULTS

# NI TOOL COMPONENTS

1. Customized summary report (CSR) on pre-existing assessments autogenerated from BD

2. Organized note-taking template with placeholders for logging key insights from ongoing sessions

	Item	Response	Response/notes	Nutrient Variables/normative	Avg	Session (number; date/time)	Session (1;
Tech/CONTACT INFORMATION - import	Name (Last/First)			Total calories (600-4400)	1548.3	Attempt	
	ipad facetime email			Total carbs (45-65% cals)	195.8	Attendance (Drop down list)	
	ipad phone number		Not for FaceTime use	Total protein (more than 12% calories)	74.5	Attendance related notes	
	Participant phone (1/2)			Total fat (20- 35% calories)	54.9		
	Participant email			Grains (9 oz)	4.1		SMART GOALS
	Intervention Group	Immediate		Fruits (2 cups)	0.3	Smart Goal #1	
	Alternate Contact Name/Relationship			Dairy (3 cups)	0.2	SG# 1 Met? (Y/N/NA/somewhat)	
	Alt contact phone			Vegetables (3.5)	2.4	Relevant notes	
			Protein (6.5 oz)	8.0			
Gender/Age	Male		Food group notes	0.0			
Enrollment info: Baseline Anthro/injury/Blood related info-import	height (inches/cm)	57 inches		Sodium* (2300 mg)	3129.3		
	weight (lbs/kg)			Sodium- notes (highest contributors)	Shrimp gumbo (732g)=2766.96mg; Potato salad with egg from		Smart Goal #2
	Abdominal girth/Waist circumference			sat fat (22 g) no more than 10% of total cals	16.8	SG#2 Met? (Y/N/NA/somewhat)	
	WC1 (smallest-)	71 cm		Sat fats- notes (highest contributors)	Beef steak, broiled or baked, lean and fat eaten (201g)=11.2078mg	Relevant notes	
	WC2 (at hip) in cm	78 cm		Added sugars	12.9		
	BP (systolic/Diastolic)	120/80		Added sugars- notes (highest contributors)	Tea, iced, brewed, black, pre-sweetened with sugar (620g)=11.346mg-E		READINESS/CONFIDENCE
	BP treatment Y/N	FALSE	Notes:	Fiber (more than 14g/1000 calories)	13.4	Readiness to make a change (out of 10)	
	BMI	22.7		Fiber- notes (highest contributors)	Cereal (Kellogg's All-Bran Complete Wheat Flakes) (39g)=6.747mg;Shrimp gumbo	Confidence to make a change (out of 10)	
	wrist (cm)	18.5		vitamin B12 (2.4mcg)	5.8	Related notes	
	Age	54		calcium (1000 mg)	805.0		
	DOB			Potassium (3400)	2346.7		
	Date of Injury:			Iron (18 gm)	20.9		
	Level of Injury:			Alcohol (<2 drinks)	2346.7		
	Complete or Incomplete?			Other relevant notes related to ASA-24Hr-recalls:			MODULES
	BIA- Total body fat% Blood draw date			1. Blood lipid profile numbers are high		Module delivery (drop down) Modules/topics covered (dropdown from workbook)	
	Blood_Total_cholesterol	268		2. Please refer to top contributors of sat fat, Sodium and added sugar in the highlighted cells above and educate accordingly.		Relevant notes	
Blood_Glucose_fasting	111						

	Item	Response	Response/notes	Nutrient Variables/normative	Avg	Session (number; date/time)	Session (1;
Tech/CONTACT INFORMATION - import	Name (Last/First)			Total calories (600-4400)	1548.3	Attempt	
	ipad facetime email			Total carbs (45-65% cals)	195.8	Attendance (Drop down list)	
	ipad phone number		Not for FaceTime use	Total protein (more than 12% calories)	74.5	Attendance related notes	
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	WC2 (at hip) in cm	78 cm		Added sugars	12.9		
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	BP treatment Y/N	FALSE	Notes:	Fiber (more than 14g/1000 calories)	13.4		Readiness to make a change (out of 10)
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	Complete or Incomplete?			Other relevant notes related to ASA-24Hr-recalls:			MODULES
	BIA- Total body fat%			1. Blood lipid profile numbers are high			Module delivery (drop down)
	Blood draw date			2. Please refer to top contributors of sat fat, Sodium and added sugar in the highlighted cells above and educate accordingly.			Modules/topics covered (dropdown from workbook)
	Blood_Total_cholesterol		268				Relevant notes
	Blood_Glucose_fasting		111				

Auto-populated customized summary report from **BD**

Freezing Pane

Logging ongoing session notes

# CUSTOMIZED SUMMARY REPORT FROM BD

I. Customized summary report  
(CSR) on pre-existing assessments  
autogenerated from BD

	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5
<b>BMI (Kg/m2)</b>	<b>29.6</b>	<b>31.8</b>	<b>36.7</b>	<b>35.4</b>	<b>40.01</b>
<b>FM%-BIA</b>	<b>51.1</b>	<b>41.4</b>	<b>52.2</b>	<b>25.03</b>	<b>58.7</b>
<b>Waist Circumference (cm)</b>	<b>122</b>	<b>99.5</b>	<b>118.5</b>	<b>118</b>	<b>146</b>
<b>Exercise subjective rating</b>	Light	Moderate	Very Light	Heavy	Moderate
<b>TotalCholesterol</b>	173	144	174	141	137
<b>Triglycerides</b>	<b>151</b>	54	<b>302</b>	71	71
<b>HDL</b>	<b>30</b>	44	<b>25</b>	50	44
<b>LDL</b>	<b>113</b>	89	89	77	79
<b>non-HDL</b>	<b>143</b>	100	<b>149</b>	91	93
<b>Vitamin D</b>	<b>25.4</b>	<b>23.8</b>	<b>23.2</b>	45.4	<b>30.5</b>

CSR FROM BASELINE DATA:  
BLOOD/ ANTHROPOMETRIC /ACTIVITY PROFILES

# CSR FROM BASELINE DATA: DIETARY DATA OUTPUTS FROM ASA-24

Nutrient Variables/normative	Average (3 recalls)		Nutrient	Top contributing foods
Total calories (ref SCI estimates)	1548.321	OVERALL SUMMARY	Sodium	Shrimp gumbo (732g)=2766.96mg; Potato salad with
Total carbs (45-65% cals)		<p><b>Other relevant notes related to ASA-24Hr-recalls:</b></p> <ol style="list-style-type: none"> <li>Blood lipid profile numbers are high</li> <li>Please refer to top contributors of sat fat, Sodium and added sugar in the highlighted cells and educate accordingly.</li> <li>Positive feedback: Top contributing fiber rich foods highlighted in green that the participant may be encouraged to continue in their diet!</li> </ol> <p><b>Meal spacing info:</b> Total number of meals 3-4/day; overnight fasting 16 hrs; Day time meal spacing: 3 hrs</p>		
Total protein (ref SCI estimates)				
Total fat (20- 35% calories)				
Grains (9 oz)				
Fruits (2 cups)				
Dairy (3 cups)				
Vegetables (3.5)				
Protein (6.5 oz)				
Sodium* (2300 mg)				
Sat fat (<6% of total cals)				
Added sugars				
Fiber (15g)				
Vitamin B12 ( 2.4mcg)				
calcium (1000 mg)				
Potassium (3400 mg)				
Iron (18 gm)				
Alcohol (<2 drinks)	yes			<p>Beef steak, ten</p> <p>fat eaten with whipped gumbo</p> <p>with sugar with whipped , with icing</p> <p>eat Flakes)</p> <p>s, NS as to</p> <p>1000, cooked (52.5g) 5.5775mg;</p>



# ASA-24 RESPONDENT NUTRITION REPORT (RNR) VS CUSTOMIZED SUMMARY REPORT (CSR)

	RNR	CSR
Length of report/accessibility	# 1 report/recall # 30 pages per participant # Cannot be embedded within notes template	#Single report of average measures #Integrated within the notes template
Dietary Guidelines	Non-SCI specific	SCI-specific
Customized list of top contributing foods	No	Yes
Meal spacing information	Not readily available	Available

# NOTE-TAKING TEMPLATE

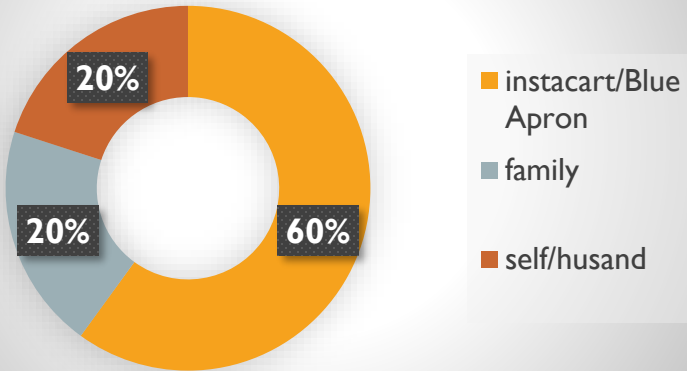
2. Organized note-taking template with placeholders for logging key insights from ongoing sessions

**PARTICIPANT PROFILE:  
DEMOGRAPHIC/INJURY CHARACTERISTICS**

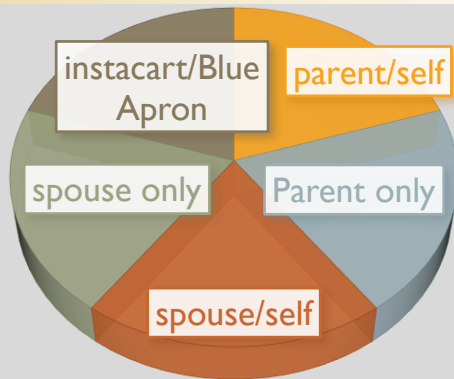
<b>Gender</b>	<b>Age (yrs)</b>	<b>Ethnicity</b>	<b>Injury</b>	<b>DOI (yrs)</b>
Male	45	Hispanic	Tetraplegia	25
Female	29	Hispanic	Tetraplegia	10
Male	58	Hispanic	Tetraplegia	36
Male	52	Non-Hispanic	Paraplegia	4
Female	28	Hispanic	Paraplegia	3

# NOTE-TAKING TEMPLATE: SHOPPING, FOOD PREP AND MOTIVATIONS

## Shopping



## Food preparation



## NOTE-TAKING TEMPLATE: SURPRISE TAKEAWAYS FOR PARTICIPANTS

- Role of fiber in improving cholesterol beyond BM
- Reading nutrition labels
- Sodium Education “....after looking at Na in labels, you just ruined by childhood”!
- Soluble vs insoluble fiber
- Nutrition workbook and module contents introduced new knowledge “The workbook is my bible”

# NOTE-TAKING TEMPLATE: UNDERSTANDING CHALLENGES TO ADHERENCE

**Eating only one meal a day and not willing to make a change**

**Bowel care affecting food choices**

**Intermittent skipping of foods for an entire day and only relying on fruits on some days**

**Holiday stress-PTSD owing to injury occurrence during holidays**

**Travel/busy schedules challenge with goal adherence**

**Dependent on mother for food prep, not wanting to burden with new recipes (guilt)**

**Afraid to try new things or substituting**

**In bed all day, relies on convenience foods and limited choice of foods, working wife (also caregiver)**

# CUSTOMIZED SUMMARY REPORT AND NOTE-TAKING TEMPLATE COMPONENTS

## PARTICIPANT

Contact information/  
iPad details

**Nutritional outputs and estimates:** Macro/select micronutrient intakes, food group, contributing foods, Caloric/fiber/IBW estimates

Anthropometric/BIA/  
Demographic/Injury profile

**Health factors:** Blood work, Bowel management, pain, Meds,

**Personal behaviors:** Dietary behaviors/meal spacing preferences, attitudes, beliefs and knowledge

DIETS

**Social factors:** living situation, SES, Food insecurity, culture

■ Summary report

■ Templated for tracking

**Physical factors:** Access to shopping and cooking, time, skills

**Biological factors:** hunger, appetite, taste

**Psychological factors:** mood, stress, guilt

**Study session related tracking:**

- EDUCATION/MODULE DELIVERY;
- TECHNICAL ISSUES
- SESSION ATTENDANCE
- CHALLENGES, BARRIERS, STRENGTHS

## RESULTS: PERCEIVED BENEFITS OF THE NI TOOL

- Reduced time burden for SD and optimized use of counseling session time
- Aided in pre-planning of individualized education approaches and providing personalized feedback to participants
- Focused probing to elicit deeper insights on dietary behaviors and adherence
- Allowed systematic organization and documentation of session notes

MATLAB script streamlined the report generation process by reducing staff burden, time and inadvertent errors with data entry.

**Individual manual report generation time: up to 2 hours vs  
MATLAB report generation time: <40 secs/report**



## LIMITATION

We were not able to quantify the perceived efficaciousness of the summary report and note-taking template and relied mostly on feedback/validation from SD

## CONCLUSIONS

Early cross-exploration of BD and efficient organization of NI session notes may be valuable in optimizing NI sessions by cutting down time-burden, helping provide SCI-specific dietary feedback and delivery of targeted interventions.

## FUTURE APPLICATIONS

Future dietary studies using a similar comprehensive and standardized tool can **collectively contribute towards a repository of insights** that can inform effective SCI-specific nutritional counseling strategies.

# REFERENCES

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# QUESTIONS

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