



STUNTING & SARCOPENIA IN *LOS ABUELITOS* (THE GRANDFATHERS) OF NAHUALÁ, GUATEMALA

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CONTENT



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PROJECT SITE

- CeSSIAM – Center for Studies of Sensory Impairment, Aging, and Metabolism

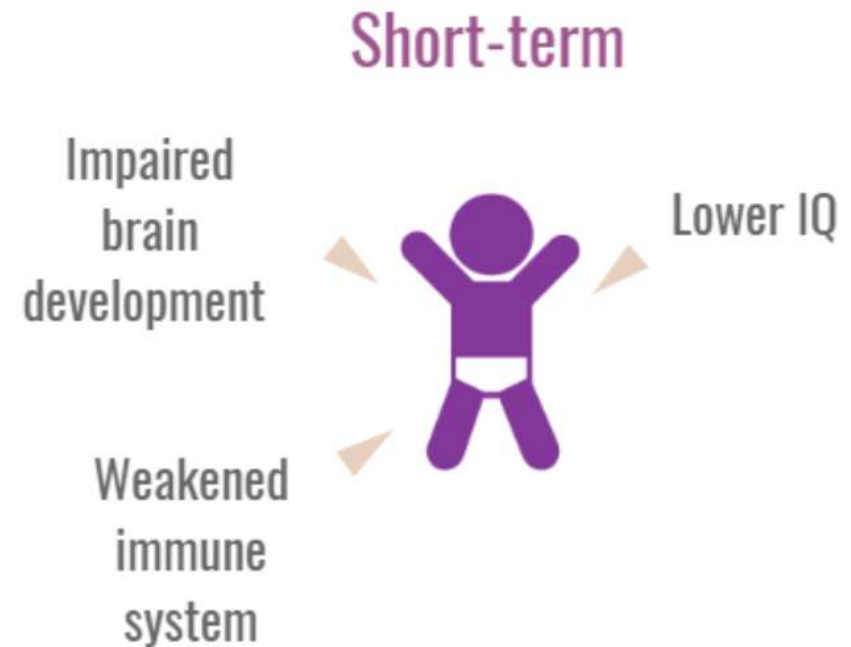
“Our mission is to improve human health and well-being in underprivileged societies through better nutrition.”

- Preceptors: Dr. Noel Solomons and Maria Del Rosario
- Nahualá CAP – Local Public Health Center



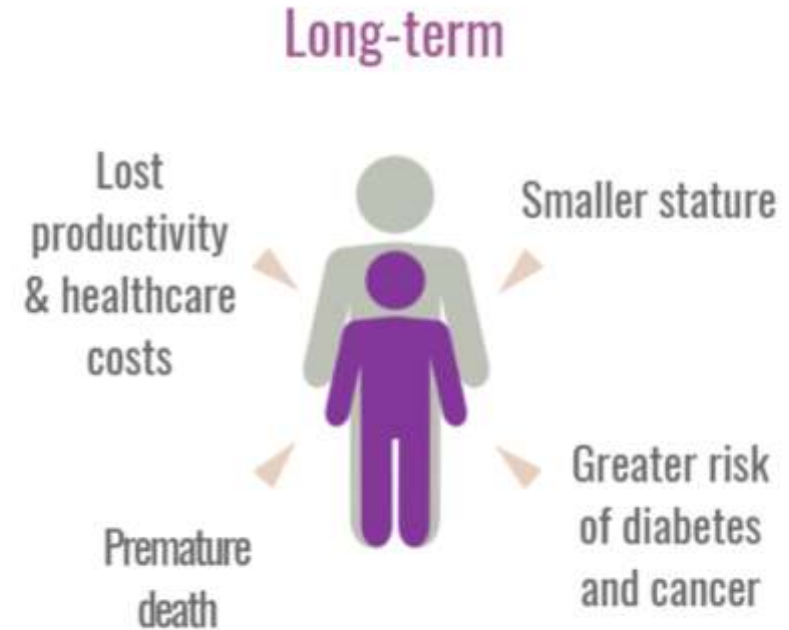
STUNTING - CHILDHOOD

- Stunting is low height-for-age
 - A Z-Score < -2 on the WHO indices
- Used as an indicator for malnutrition
- 46.5% of children < 5 y in Guatemala were stunted in 2017
 - Prevalence is 70% in some municipalities
 - Indigenous communities disproportionately affected



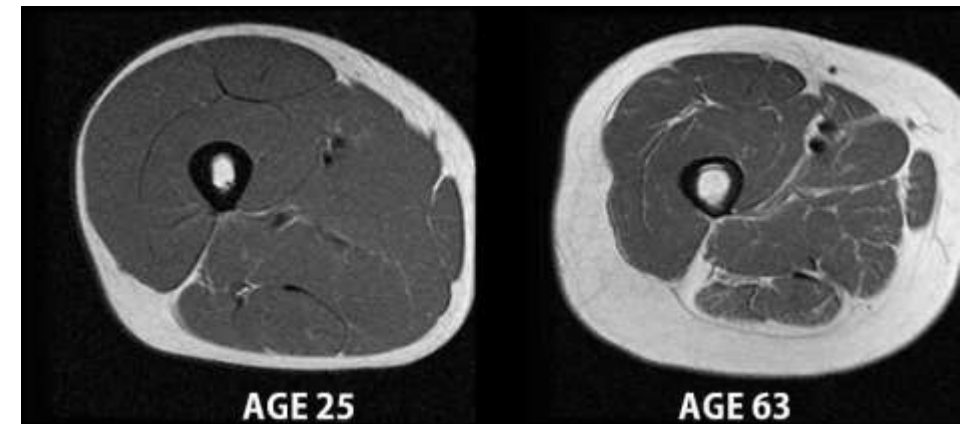
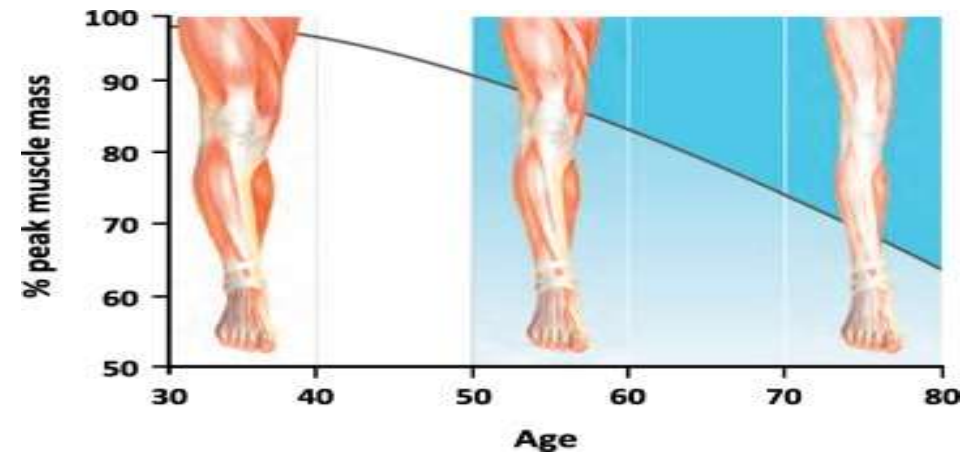
STUNTING - ADULTHOOD

- Stunting after the age of 3 becomes irreversible and leads to adult and elderly stunting
- Little is known about the prevalence of stunting in the elderly indigenous men in Guatemala
- 89.3% (N=75) Women ≥ 60 y in Nahualá were stunted in previous study



SARCOPENIA

- Sarcopenia is the involuntary loss of skeletal muscle mass associated with aging
- Muscle loss leads functional decline and increase falls
- It is an irreversible process of life, however impact can be managed
- Sarcopenia is under recognized and poorly assessed in regular clinical practice



OBJECTIVES



Determine the prevalence of stunting (Height <150cm) in men (≥ 60 y) living in rural Guatemala.



Examine the association between stunting and sarcopenia (determined by relative leg skeletal muscle mass) in this population.

METHODS



RECRUITMENT



DATA COLLECTION



ANALYSIS

RECRUITMENT



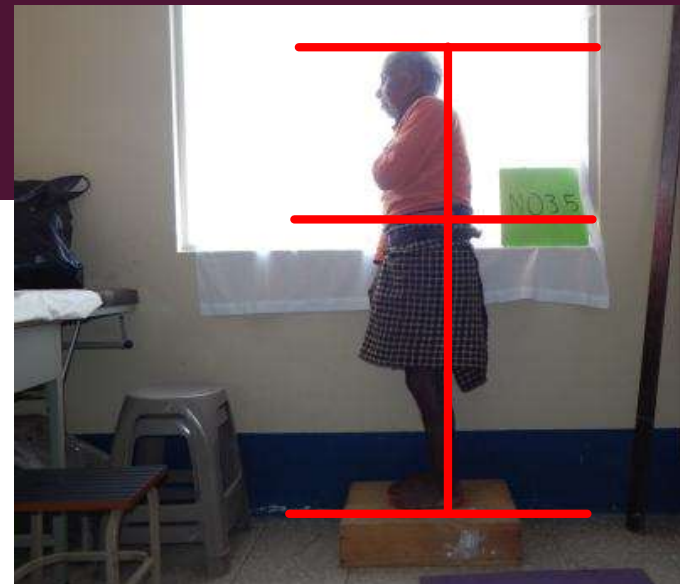
Eligible participants had to be Male and 60 Years or older at time of enrollment



Strategies: Health center patients, door – to – door, passing out flyers, and community radio station announcements

DATA COLLECTION – FIRST VISIT

- Demographic Information
 - Age
 - Highest Level of Education
 - Marital Status
 - Daily Physical Activity
- Anthropometric Measurements
 - Weight
 - Height
 - Sagittal Photography



DATA COLLECTION – SECOND VISIT

- Bioelectric Impedance Analysis (BIA)
- Captured variables Lean Soft Tissue (LST)
- Measured using RJL Systems Quantum V Segmental BIA



ANALYSIS



Stunting defined as height $< 150\text{cm}$



Leg skeletal muscle density calculated as $\text{LST(KG)}/\text{Leg Length (CM)}$

ANALYSIS

- Bivariate Analysis
 - Demographic and body composition characteristics were compared by height status (stunted vs. not stunted) - Independent-samples *t* test for continuous variables, and the Pearson chi-square test or Fisher exact test (if expected cell count was <5) for categorical variables
- Multivariate Analysis
 - Assess relationship between stunting and muscle density status, adjusting for potential confounders (age, education status, and physical activity status) – Logistic Regression
- All statistical analysis was performed on STATA 16.0 for MAC OS
- Findings with a p-value < 0.05 were considered statistically significant



RESULTS

Table 1. Baseline Characteristics by Height Status (Stunted v. Not Stunted)

	Not Stunted	Stunted	Total	
	(N=24, 48%)	(N=26, 52%)	N=50	
Characteristic	N (Column %)	N (Column %)	N (Row%)	p-value
Mean Age (SD)	68.79 (6.79)	76.00 (7.85)	72.54 (8.14)	0.0011
Education				0.024
No education	8 (33.3%)	17 (65.4%)	25 (50%)	
Primary or Higher	16 (66.7%)	9 (34.6%)	25 (50%)	
Daily Physical Activity				0.65
Low to Moderate	6 (25%)	8 (30.8%)	14 (28%)	
Heavy	18 (75%)	18 (69.2%)	36 (72%)	
Marital Satus*				0.721
Single	5 (20.8%)	4 (15.4%)	9 (18%)	
Married	19 (79.2%)	22 (84.6%)	41 (82%)	
Mean BMI (SD)	24.33 (4.09)	21.94 (2.82)	23.09 (3.66)	0.022

*Indicates two-sided Fisher's exact test.

Table 2. BIA Variables by Height Status (Stunted v. Not Stunted)

	Not Stunted	Stunted	Total	
	(N=22)	(N=25)	(N=47)	
Characteristic	N	N	N	p-value
Mean Right Leg LST Density (KG/CM)	.066 (.008)	.054 (.009)	.059 (.010)	<.0001
Mean Left Leg LST Density (KG/CM)	.064 (.008)	.052 (.009)	.058 (.011)	<.0001

Table 3. Logistic regression model of the association between Muscle Density and Stunting.

Variable	OR(CI)
Muscle Density (KG/CM)	
High Density	Referent
Low Density	9.4 (1.60-54.76)

Adjusted for Age, Education Status, Physical Activity

Participants with Low Muscle Density were 9.4 times as likely to have been stunted, compared to those with high muscle density

IMPLICATIONS

Those who are stunted appear to have lower muscle density

- Indicates that early life malnutrition (stunting) could have affects on sarcopenia
- Fortification of early life nutrition

Sarcopenia needs better clinical management

- Having equipment like the BIA could aid assessment of muscle density
- General awareness among the population

REFLECTIONS

Recruitment

- Actions to actively find participants should be taken earlier
- Door-to-door recruitment was most effective

Data collection

- Multiple visits should be avoided with older populations as many barriers hinder retention
- Multiple locations in Nahualá

Analysis

- Index or reference for skeletal muscle mass in extremities
- Larger sample size

ACKNOWLEDGEMENTS

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- Maria Rosalia Tambriz, Interpreter
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- Lastly, thank you to all the participants who gave their time to make this project a reality.



GRACIAS! – MALTYOX!

