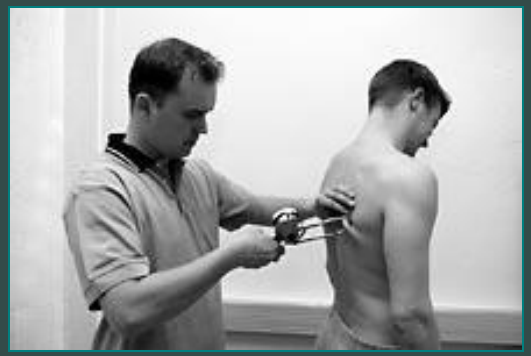
AIDS e Nutrição

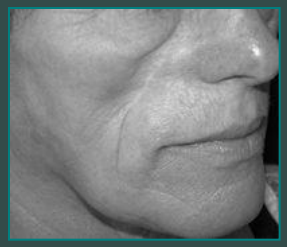
jacque@fmrp.usp.br

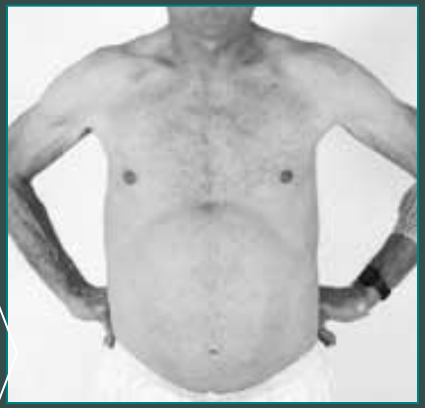
Nutrição e SIDA

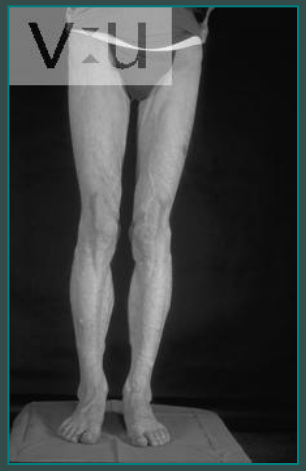
Caquexia



Eutrofia







Lipodistrofia

Transição epidemiológica

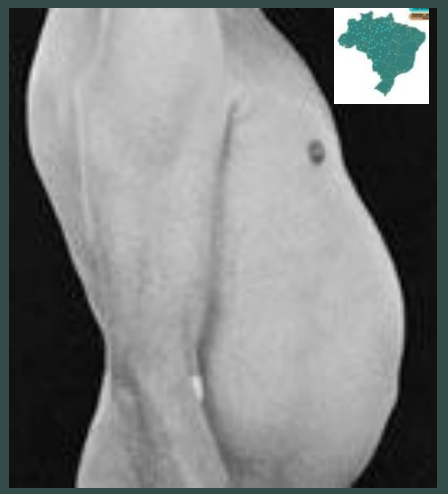
Estado nutricional de pacientes com AIDS

Caquexia

↓ Massa corporal magra

↓ Massa corporal gorda

Antiretroviral



Síndrome da Lipodistrofia

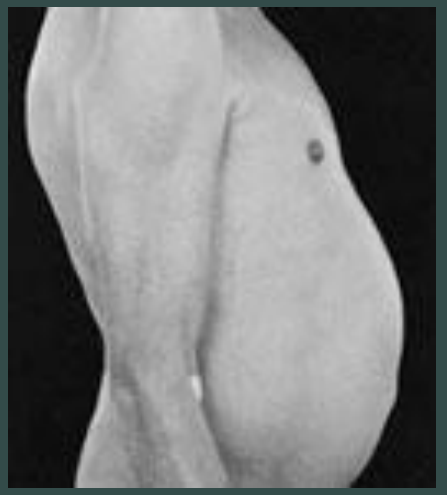
Dislipidemia

Hiperglicemia

↑ gordura abdominal

Estado nutricional de pacientes com AIDS: Como mensurar?

- História médica e exame físico
- Antropometria: alteração de peso; IMC; medida das dobras cutâneas; BIA; Circunferências
- Avaliação da atividade física
- Avaliação bioquímica
- Terapia medicamentosa
- História alimentar
- Avaliação psico-social



ADA REPORTS

J Am Diet Assoc. 2004;104: 1425-1441.

Etiologia da subnutrição na AIDS

- Anorexia
- Infecções oportunistas
- Alterações metabólicas
- Má-absorção
- Medicamentos
- Diarréia

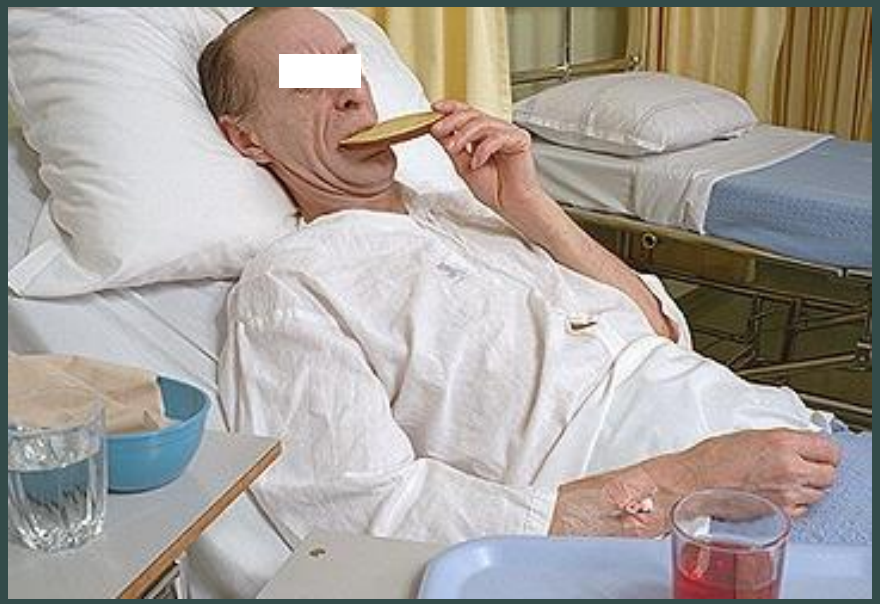
SIDA e subnutrição

Adequação de energia e nutrientes

- ✓ Alimentos naturais facilmente encontrados
- ✓ Suplementação oral de micronutrientes
- ✓ Lipídios: ajustar conforme tolerância
- ✓ Nutrição enteral e/ou parenteral
- ✓ Hiperalimentação
- ✓ Individualizar

Nemechek PM et al.
Mayo Clin Proc. 2000

Adequação de energia e nutrientes



A curto prazo, o aconselhamento nutricional, com ou sem suplementação oral pode aumentar a ingestão energética em pacientes HIV^{+} subnutridos

Rabeneck L et al. ‚JADA 1998

Adequação da ingestão de nutrientes

- ✓ Qual a real necessidade de nutrientes?
- ✓ 40-45kcal/kg/dia? 2,0 - 2,5g ptn/kg//dia?
- ✓ Necessidades nutricionais ↑ ?
- ✓ RDI: referência; possibilitar comparação com outros estudos; adequação: ≥ 67% RDI ou > 100%

Dannhauser A et al. Eur J Clin Nutr 1999

Nutrition and HIV/AIDS in infants and children in South Africa: implications for food-based dietary guidelines

Michael K. Hendricks*, Brian Eley† and Lesley T. Bourne‡

- ✓ Crianças HIV-infectadas e assintomáticas (> 10% consumo energético para manter crescimento). WHO 2003.
- ✓ Crianças HIV-infectadas sintomáticas (50-100% acima da recomendação para catch-up).WHO 2003.
- ✓ Proteína: não tem estudos; manter 10-15% valor energético total.
- ✓ Micronutrientes que reduzem morbi-mortalidade: Vitamina A e zinco. Bobat et al 2005; Coutsoudis et al 1995.

Nutrition and HIV/AIDS in infants and children in South Africa: implications for food-based dietary guidelines

Michael K. Hendricks*, Brian Eley† and Lesley T. Bourne‡

✓ Crianças HIV-infectadas com peso abaixo do p3: suplemento oral.

. *Maternal and Child Nutrition* (2007), 3, pp. 322–333

Osteopenia e Osteoporose: prevenção

- Manter peso adequado e evitar perdas
- Reduzir ou parar de fumar; álcool; cafeína
- Reduzir bebidas ricas em ácido fosfórico (carbonatadas)
- Aumentar bebidas e alimentos ricos em cálcio (500 a 1200mg/d)
- Atividade física; Adaptar HAART

ADA REPORTS

J Am Diet Assoc. 2004;104: 1425-1441.

Vitaminas e AIDS

APPLIED NUTRITIONAL INVESTIGATION

Niacin Metabolite Excretion in Alcoholic Pellagra and AIDS Patients With and Without Diarrhea

Jacqueline Pontes Monteiro, RD, PhD, Daniel Ferreira da Cunha, MD, PhD, Dalmo Correia Filho, MD, PhD, Mario León Silva-Vergara, MD, PhD, Vitorino Modesto dos Santos, MD, PhD, José Carlos da Costa Jr., MD, Renata Margarida Etchebehere, MD, MS, Jussara Gonçalves, MD, Selma Freire de Carvalho da Cunha, MD, PhD, Alceu A. Jordão, MD, PhD, Paula Garcia Chiarello, RD, PhD, and Helio Vannucchi, MD, PhD

From the Nutrition School of Medical School of Ribeirão Preto, University of São Paulo, Ribeirão Preto, Brazil; and the Department of Internal Medicine, Triângulo Mineiro Medical School, Uberaba, Brazil

Nutrition Volume 20, Number 9, 2004

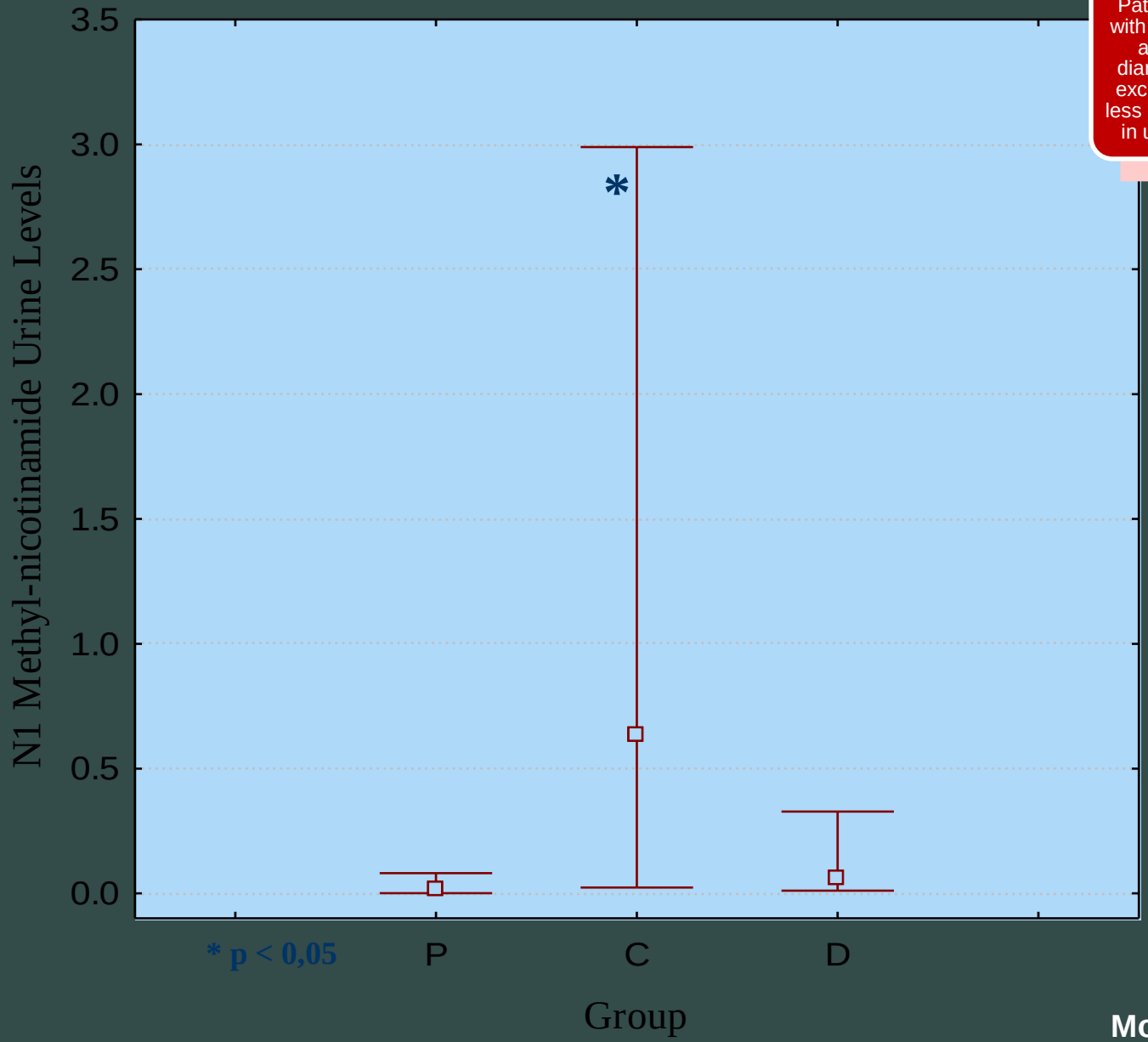
HIV infection induces a state of "intracellular pellagra".

Patients with AIDS and diarrhea may have niacin depletion.

This study compared 24-h urine excretion of N1-methyl-nicotinamide among patients with pellagra and patients with AIDS who did and did not have diarrhea.

Mucosal intestinal biopsy (endoscopy, colonoscopy), malabsorption tests, detection of parasites in stool.

Graphic 1: N1- methyl-nicotinamide urine levels in HIV positive and pellagrins HIV negative alcoholic patients



Patients with AIDS and diarrhea excreted less N1MN in urine

Impaired niacin nutritional status

Increased metabolic needs

P = Pelagra

C = AIDS sem diarréia

D = AIDS com diarréia

Monteiro JP et al, 2004

Journal of Pediatric Gastroenterology and Nutrition
44:629–633 © 2007 by European Society for Pediatric Gastroenterology, Hepatology, and Nutrition and
North American Society for Pediatric Gastroenterology, Hepatology, and Nutrition

Niacin Nutritional Status in HIV Type 1–Positive Children: Preliminary Data

*Marina Hjertquist Tremeschin, *Maria Célia Cervi, *José Simon Camelo Júnior,
*Bento Vidal de Moura Negrini, *Francisco Eulógio Martinez, *Fabrízio Motta,
*Mônica Silva de Souza Meirelles,
*Helio Vanucchhi, and †Jacqueline Pontes Monteiro

*Medical School of Ribeirão Preto, and †Department of Nutrition and Metabolism,
Medical School of Ribeirão Preto, University of São Paulo, São Paulo, Brazil

Nutritional status and the 24-hour urine excretion of N1MN.

HIV-positive children and HIV-negative children who were or were not born of mothers with HIV-1 infection.

TABLE 1. *Anthropometric measures and body composition by bioelectrical impedance technique of HIV-positive children (group 1), HIV-negative children born to HIV-positive mothers (group 2), and control children (group 3)*

Parameters*	Group 1 (n = 20)	Group 2 (n = 10)	Group 3 (n = 10)
Weight adequacy, %	100 (77–198)	102 (83–123.5)	98 (83–120)
Height adequacy, %	98.4 ± 5.5	99.6 ± 3.7	99.6 ± 5.2
Weight/height, kg/cm %	104 (59–167)	97 (84.1–117)	99.6 (88.6–116)
Triceps skinfold thickness (% of adequacy)	90.4 ± 44.2	91.1 ± 32	81.9 ± 40.3
Subscapular skinfold thickness, mm	8.3 ± 7.9	6.8 ± 1.76	7.35 ± 5.5
Midarm circumference, cm	16 ± 2.8	17.6 ± 3.3	14.9 ± 5.5
Lean body mass, %	71.3 ± 8.7	76.2 ± 6.2	74.1 ± 8.0
Fat mass, %	28.9 ± 8.7	23.8 ± 6.2	25.9 ± 8.0
Total body water, %	52.6 ± 11	58.5 ± 4.7	56.9 ± 6.0
Extracellular water, %	34.1 ± 5.5	35.2 ± 3.5	33.9 ± 4.2
Intracellular water, %	38.7 ± 7.7	40.9 ± 8.7	39.4 ± 9.0
Body cell mass, %	55.5 ± 11.2	58.5 ± 12.3	57.5 ± 13.3

*$P > 0.05$.

Age

Gender

Percentage of malnutrition

Anthropometry

Body composition

TABLE 2. *Energy and nutrient intake and daily urinary excretion of MNA of HIV-positive children (group 1), HIV-negative children born to HIV-positive mothers (group 2), and control children (group 3)*

Parameters*	Group 1 (n = 20)	Group 2 (n = 10)	Group 3 (n = 10)
Energy, kcal/d	3033 ± 1401	2894.4 ± 1008	2770 ± 694
Protein, g/d	92.8 (24.2–294)	90.5 (34.5–142)	95.8 (39.0–112.3)
Niacin, mg/d	18.0 ± 11.4	18.9 ± 8.0	14.2 ± 5.2
Children with niacin intake below DRI, %	22.2	10	20
Zinc, mg/d	9.25 (2.08–25.9)	9.2 (4.0–11.5)	7.7 (2.4–10.8)
Vitamin B_6, mg/d	2.6 (0.5–19.8)	2.7 (0.89–13.2)	2.1 (0.75–60)
Tryptophan, mg/d	1008 (154–3064)	895.4 (443–1299)	953.3 (234.6–1242)
Urinary MNA (mg/g creatinine)	4.68 (0.75–14.9)	3.74 (1.13–5.69)	3.85 (1.80–8.19)
Children with MNA <2 mg/g creatinine, %	15	10	10

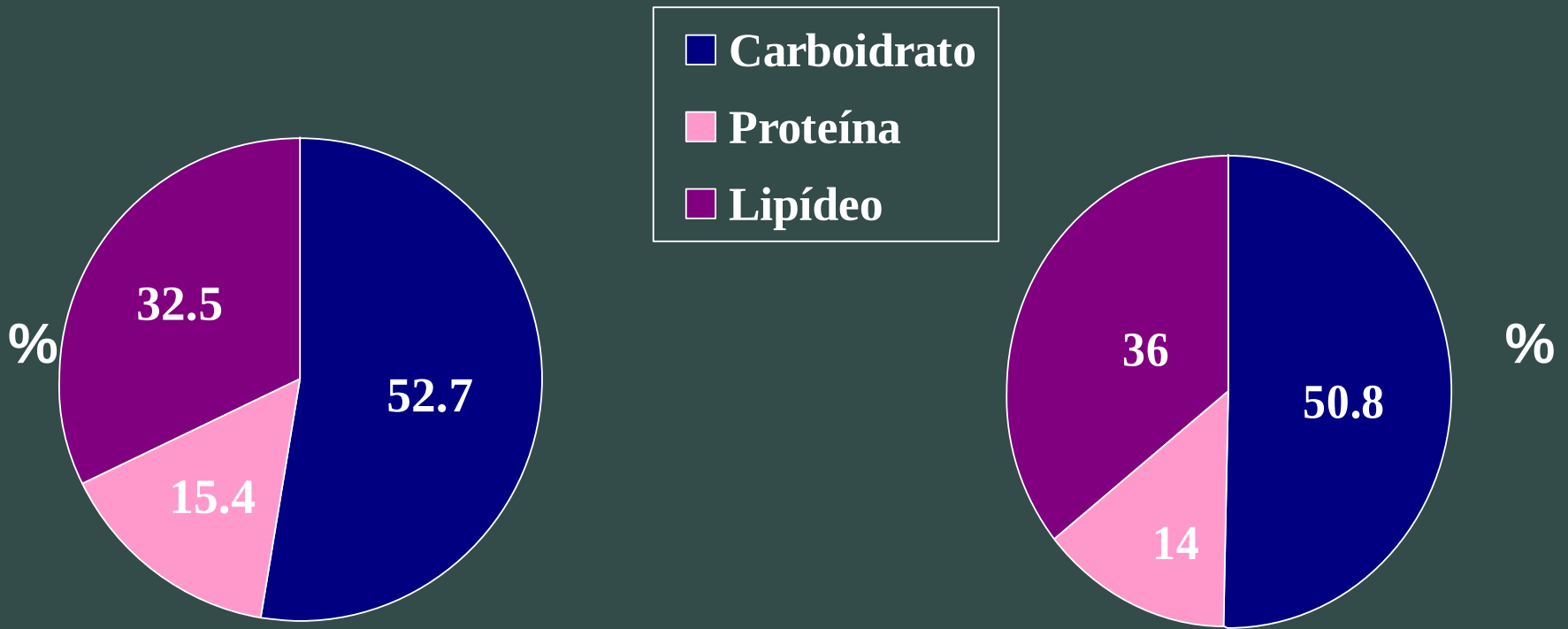
*$P > 0.05$.

Daily niacin, tryptophan, vitamin B6, and zinc intakes did not differ across groups.

Urinary niacin values per gram of creatinine were similar and adequate across the groups.

Adequate nutritional status, intestinal absorption and stable clinical condition.

Ingestão de calorias em subnutridos e não-subnutridos com AIDS antes HAART



SPE (2.868,4 ± 1.602,3 kcal)

N-SPE (3.151,6 ± 1.661,2 kcal)

Monteiro JP et al., 2000

Ingestão (mg/dia) e níveis séricos (μmol/l) de α-tocoferol em pacientes com AIDS

	Subnutridos	Não-subnutridos
R-24h	35,2 ± 17,9	45,6 ± 20,3
FFQ	49,4 ± 10,8	47,2 ± 16,5
Níveis séricos	17,9 ± 7,2	19,9 ± 6,3

41,3% deficiência

Monteiro JP et al., 2000

al, 2000

APPLIED NUTRITIONAL INVESTIGATION

Nutritional Assessment of Vitamin E in Malnourished Patients With AIDS

Jacqueline Pontes Monteiro, MS, Daniel Ferreira da Cunha, PhD, Selma Freire Carvalho Cunha, PhD, Vitorino Modesto dos Santos, MS, Alceu A. Jordão, PhD, Dalmo Correia, MS, Mario León Silva-Vergara, PhD, Helio Vannucchi, PhD, Virmondes R. Júnior, PhD, and Maria de Lourdes Pires Bianchi, PhD

From the Nutrition Support Team and the Nutrition Division, Department of Internal Medicine, Medical School of Uberaba, Uberaba; and the Nutrition Division and the Pharmaceutical Division, University of São Paulo, São Paulo, Brazil

Antes HAART

TABLE I.

NUTRITIONAL PARAMETERS OF MALNOURISHED AND NON-MALNOURISHED AIDS PATIENTS

Parameters	Malnourished	Non-malnourished
Weight (kg)*	53.4 ± 7.9	61.5 ± 7.5
Height (cm)	170.2 ± 8.5	166.2 ± 9.9
BMI (kg/m^2)*	18.5 ± 2.5	22.5 ± 3.5
HCI (%)*	61.4 ± 15.6	92.4 ± 21.0
Albumin (g/dL)	3.9 ± 0.8	4.5 ± 0.7
TIBC (μg/dL)*	194.1 ± 104.1	280.6 ± 63.9
Transferrin (μg/dL)*	112.2 ± 83.3	181.5 ± 51.1

* $P < 0.05$.

BMI, body mass index; HCI, height-creatinine index; TIBC, total iron-binding capacity.

TABLE II.

INTAKE, SERUM LEVELS, AND EXCRETION OF α-TOCOPHEROL IN MALNOURISHED AND NON-MALNOURISHED AIDS PATIENTS

Parameters*	Malnourished	Non-malnourished
Energy intake (kcal/d)	3031.5 ± 1542.1	3151.6 ± 1661.2
Protein intake (g/d)	117.1 ± 61.5	115.3 ± 63.0
Carbohydrate intake (g/d)	399.5 ± 203.1	400.0 ± 206.1
Lipid intake (g/d)	109.6 ± 74.9	128.9 ± 80.3
α-Tocopherol intake (mg α-tocopherol)	50.0 ± 11.0	47.2 ± 16.5
α-Tocopherol serum levels (μmol/L)	17.8 ± 7.2	19.8 ± 6.3
Urinary α-tocopherol (μmol/L)	0.65 ± 0.40	1.15 ± 0.7

* There were no statistical differences between the two groups.

Ingestão (μg/dia) e níveis séricos (μmol/l) de retinol em pacientes com AIDS

	Subnutridos	Não-subnutridos
R-24h	667,7 (218,2 - 2.588,9)	763,5 (99,0 - 2.946,4)
FFQ	1.920,6 (773,8 - 5.590,3)	1.292,7 (249,4 - 4.745,0)
Níveis séricos*	0,71 ± 0,42	1,12 ± 0,34

* p<0,05

70% deficiência

Monteiro JP et al., 2000

Ingestão (μg/dia) e níveis séricos (μmol/l) de β-caroteno em pacientes com AIDS

	Subnutridos	Não-subnutridos
R-24h	2.674 (0 - 6.668)	2.109 (360 -18.331)
FFQ	4.150 (446 - 17.464)	3.318 (366 - 13.144)
Níveis séricos	0,24 ± 0,20	0,22 ± 0,16

80% deficiência

Monteiro JP et al., 2000

Ingestão

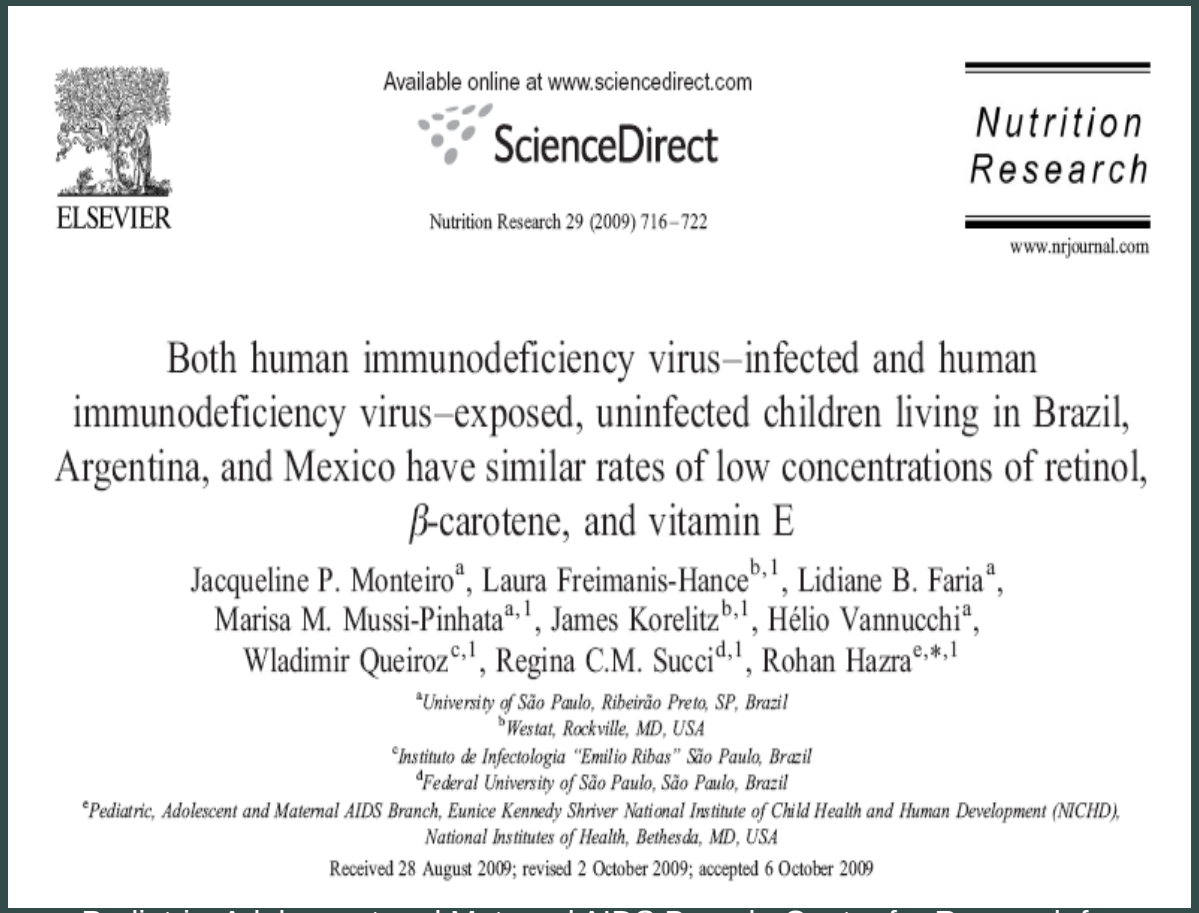
Retinol

β-caroteno

Estresse oxidativo

Retinol sérico

AIDS and Nutrition



ELSEVIER

Available online at www.sciencedirect.com

ScienceDirect

Nutrition Research 29 (2009) 716–722

Nutrition Research

www.nrjournal.com

Both human immunodeficiency virus–infected and human immunodeficiency virus–exposed, uninfected children living in Brazil, Argentina, and Mexico have similar rates of low concentrations of retinol, β-carotene, and vitamin E

Jacqueline P. Monteiro[a], Laura Freimanis-Hance[b,1], Lidiane B. Faria[a], Marisa M. Mussi-Pinhata[a,1], James Korelitz[b,1], Hélio Vannucchi[a], Wladimir Queiroz[c,1], Regina C.M. Succi[d,1], Rohan Hazra[e,*,1]

[a]*University of São Paulo, Ribeirão Preto, SP, Brazil*
[b]*Westat, Rockville, MD, USA*
[c]*Instituto de Infectologia "Emilio Ribas" São Paulo, Brazil*
[d]*Federal University of São Paulo, São Paulo, Brazil*
[e]*Pediatric, Adolescent and Maternal AIDS Branch, Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD), National Institutes of Health, Bethesda, MD, USA*

Received 28 August 2009; revised 2 October 2009; accepted 6 October 2009

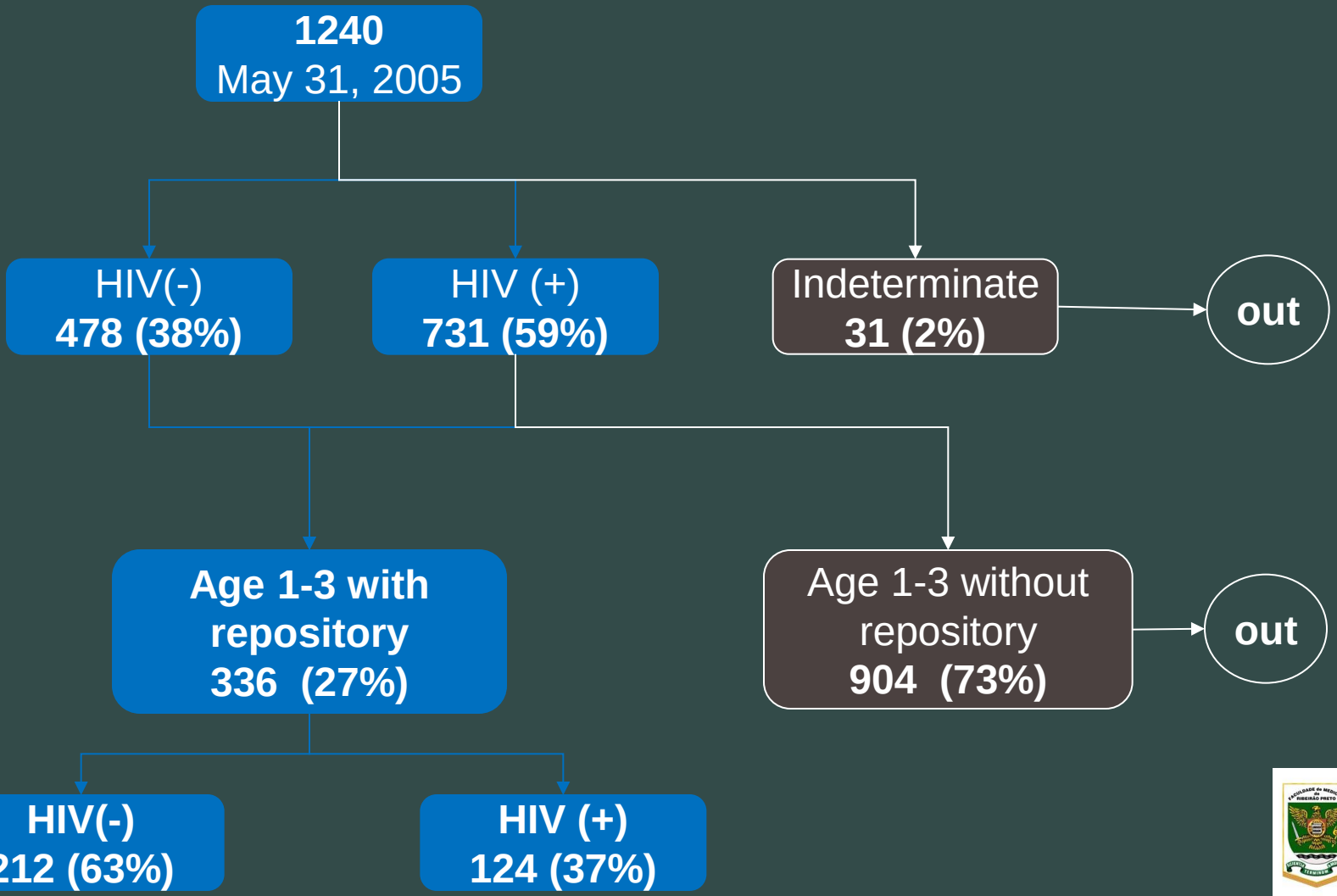
Cross-sectional substudy of a larger cohort study at clinical pediatric HIV centers in Latin America.

To describe the prevalence of low concentrations of retinol, β-carotene, and α-tocopherol in a group of HIV-infected Latin American children and a comparison group of HIV-exposed, uninfected children.

High-performance liquid chromatography.

Pediatric, Adolescent and Maternal AIDS Branch, Center for Research for Mothers and Children, Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD), National Institutes of Health, Bethesda,MD

Results


1240
May 31, 2005
HIV(-)
478 (38%)
HIV (+)
731 (59%)
Indeterminate
31 (2%)
out
Age 1-3 with repository
336 (27%)
Age 1-3 without repository
904 (73%)
out
HIV(-)
212 (63%)
HIV (+)
124 (37%)

AIDS and Nutrition

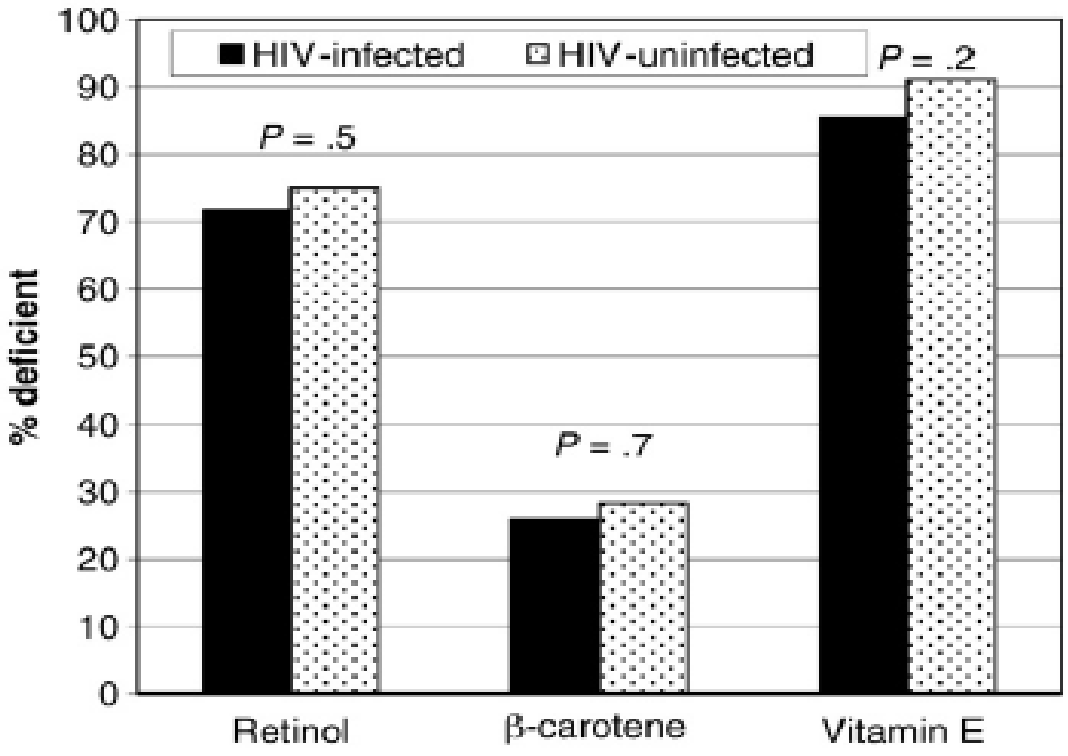


Fig. 1. Percentage of HIV-infected and HIV-exposed, uninfected subjects with low concentrations of retinol, β-carotene, and vitamin E ($P < .05$, statistical significance; Fisher exact test).

Rates of low concentrations:

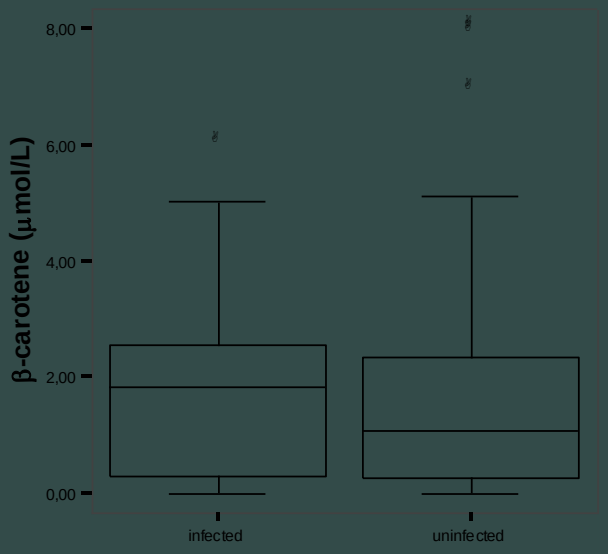
75% for retinol, 27% for β-carotene, 89% α-tocopherol.

HIV-infected treated with antiretrovirals were less likely to have retinol deficiency, but no other HIV-related factor correlated with micronutrient low serum levels.

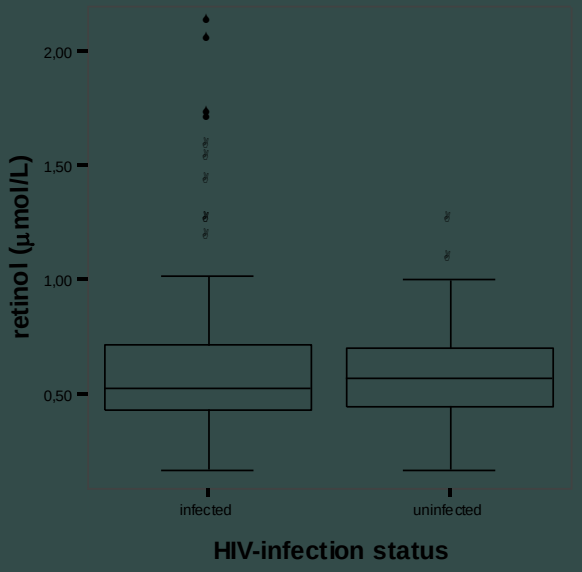
Because we did not examine a group without exposure to HIV, the results could be due to factors related to in utero HIV exposure, such as genetic variations in vitamin transfer protein genes.

Nutritional Assessment of Micronutrients in HIV-infected and -exposed uninfected children in Latin American Countries

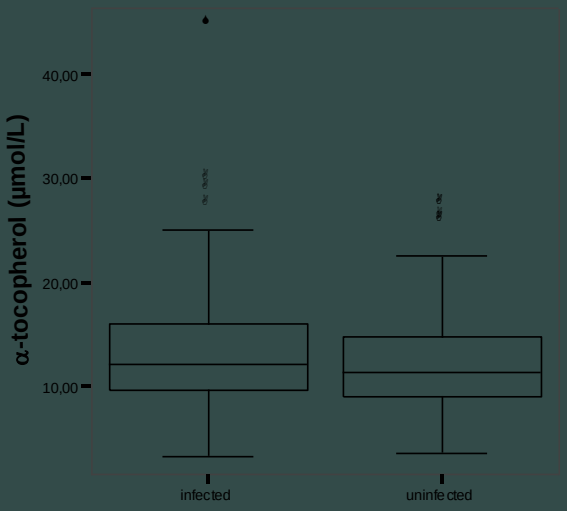
Jacqueline Pontes Monteiro1PhD, Lidiane Bernardes Faria1RD, Marisa M Mussi-Pinhata1PhD, Laura Freimanis Hance2PhD, Jim Korelitz2PhD, Hélio Vannucchi1PhD , Wladimir Queiroz3PhD, Regina CM Succi4PhD; Leslie S Serchuck5PhD ; Hazra Rohan5PhD *for the NISDI Pediatric Study Group**



27% deficiência



74% deficiência



89% deficiência

Current HIV Research, 2010, *8*, 000-000

The Association of Lipodystrophy and Oxidative Stress Biomarkers in HIV-Infected Men

Helena S. Vassimon[1], Rafael Deminice[1], Alcyone A. Machado[1], Jacqueline P. Monteiro[2] and Alceu Afonso Jordao[*,1]

[1]*Department of Internal Medicine,* [2]*Department of Pediatrics, Ribeirao Preto Medical School, University of São Paulo, Ribeirão Preto, São Paulo, Brazil*

Table 3. Oxidative Stress Biomarkers Determined in HIV-Infected Men with and without Lipodystrophy Syndrome Compared to that in Control Subjects

	HIV+LIPO	HIV	Control	p Value
	n = 10	n = 22	n = 12	
TBARS (µmol/L)	5.5 (2.6)	6.0 (4)	7.7 (8)	NS
Total hydroperoxide (H_2O_2/L)	50.5 (33) [a,b]	19.5 (13)	5 (5)	< 0.01
AOPP (µmol/L)	326 (173) [a,b]	105 (92)	80 (20)	< 0.01

Abbreviations: HIV+LIPO = HIV-infected men with lipodystrophy syndrome; HIV = HIV-infected men without lipodystrophy syndrome; Control = healthy subjects; TBARS = thiobarbituric acid reactive substances; AOPP = advanced oxidation protein products.

Results are expressed as a mean value (standard deviation); Means were compared using the ANOVA test and Tukey post hoc analysis: a ≠ Control and b ≠ HIV+LIPO- ($p < 0.05$) and NS = not significant.

To describe the status of oxidative stress and antioxidant biomarkers and their association with metabolic and body composition components of HIV-lipodystrophy syndrome.

Higher levels of hydroperoxide and advanced oxidation protein products were observed in the HIV+Lipo+ when compared to the other groups.

Similar confounding variables

- Smoking, alcohol consumption, age.
- Duration of HIV infection, HAART use, types of antiretroviral therapies.

NRTIs

- May contribute to higher levels of oxidative stress (mitochondrial toxicity).

↑ Insulin

↑ Tryglycerydes

- Associated with oxidative stress.
- ↑ TG in muscle, ↑ fatty acids in mitochondrial matrix, ↑ oxidative stress.

"Comparison of bioelectrical impedance with skinfold thickness and x-ray absoptiometry to measure body composition in HIV-infected adults with lipodystrophy". Nutricion Hospitalaria. 2010 May 3 [Epub ahead of print]

Vassimon HS, Jordao AA. Machado AA, Monteiro JP,

Table 4 – Body composition by BIA and its correlation and agreement with DXA in each groups: HIV patients with LS (HIV+LIPO+) and without (HIV+LIPO-) and healthy (Control) groups.

	HIV+LIPO+	HIV+LIPO-	Control
Fat mass, %	18 (4)[a]	19 (4)	22 (2)
Correlation	0,66*	0,74**	0,71**
Agreement	0,65 (0,38; 0,86)	0,69 (0,60; 0,86)	0,58 (0,45; 0,73)
Fat mass, kg	13 (5)	14 (5)	17 (3)
Correlation	0,87 **	0,90**	0,61*
Agreement	0,79 (0,40; 0,96)	0,85 (0,74; 0,93)	0,60 (0,41; 0,87)
Fat free mass, kg	56 (7)	58 (7)	61 (6)
Correlation	0,93 **	0,92 **	0,73 **
Agreement	0,89 (0,79; 0,96)	0,85 (0,73; 0,93)	0,61 (0,32; 0,91)

Abreviations: HIV+LIPO+ = HIV-infected man with lipodystrophy syndrome; HIV+LIPO- = HIV-infected man without lipodystrophy syndrome; Control = Healthy subjects
The correlation test used was Pearson and * = $p < 0.05$ ** = $p < 0.01$
The agreement test used was St Laurent. Values above 0.81 were considered almost perfect and beyond 0.40 as a fair strength of agreement

To compare different methods to evaluate body composition between Brazilians HIV subjects with or without lipodystrophy syndrome and healthy subjects.

Body composition can be measured by Bioelectrical Impedance Technique in HIV-infected patients with LS.

There was no correlation or agreement between anthropometric measures and x-ray absoptiometry.

Micronutrient supplementation in children and adults with HIV infection

Irlam JH, Visser ME, Rollins N, Siegfried N

This review should be cited as: Irlam JH, Visser ME, Rollins N, Siegfried N. Micronutrient supplementation in children and adults with HIV infection (Cochrane Review). In: *The Cochrane Library,* Issue 4, 2007. Oxford: Update Software.

Objetivo:

- ✓ **Avaliar se a suplementação de micronutrientes em adultos e crianças HIV-positivos tem impacto na morbidade e na mortalidade.**

- ✓ 15 ensaios randomizados: 5 vitamina A.
- ✓ Micronutrientes *vs* placebo ou *vs* nenhum tratamento

Micronutrient supplementation in children and adults with HIV infection

Irlam JH, Visser ME, Rollins N, Siegfried N

This review should be cited as: Irlam JH, Visser ME, Rollins N, Siegfried N. Micronutrient supplementation in children and adults with HIV infection (Cochrane Review). In: *The Cochrane Library,* Issue 4, 2007. Oxford: Update Software.

Conclusão:

- ✓ **Até o momento existem benefícios da suplementação de vitamina A em crianças na redução da morbidade, da mortalidade e no aumento do crescimento; para adultos, atingir as DRIs de micronutrientes parece mais aceitável.**

Nutritional interventions for reducing morbidity and mortality in people with HIV

Mahlungulu S, Grobler LA, Visser ME, Volmink J

This review should be cited as: Mahlungulu S, Grobler LA, Visser ME, Volmink J. Nutritional interventions for reducing morbidity and mortality in people with HIV (Cochrane Review). In: *The Cochrane Library,* Issue 4, 2007. Oxford: Update Software.

Objetivo:

✓ **Avaliar os efeitos dos macronutrientes via oral (dieta balanceada; rica em proteína; rica em carboidrato; rica em gordura) na redução da morbi-mortalidade em adultos e crianças HIV-positivos.**

✓ 8 ensaios randomizados: 486 participantes.

✓ Macronutrientes *vs* placebo ou *vs* nenhum tratamento

✓ Aumentou ingestão energética e protéica mas sem nenhum impacto na composição corporal e na contagem de CD4

Nutritional interventions for reducing morbidity and mortality in people with HIV

Mahlungulu S, Grobler LA, Visser ME, Volmink J

This review should be cited as: Mahlungulu S, Grobler LA, Visser ME, Volmink J. Nutritional interventions for reducing morbidity and mortality in people with HIV (Cochrane Review). In: *The Cochrane Library,* Issue 4, 2007. Oxford: Update Software.

Conclusão:

- ✓ **Ensaios clínicos pequenos e em lugares de melhor poder aquisitivo; nenhuma conclusão significativa pode ser feita sobre os efeitos dos macronutrientes na morbidade e na mortalidade.**

Nutrition and HIV/AIDS in infants and children in South Africa: implications for food-based dietary guidelines

Michael K. Hendricks*, Brian Eley† and Lesley T. Bourne‡

*Child Health Unit, School of Child and Adolescent Health, University of Cape Town, Cape Town, South Africa, †Division of Infectious Diseases, School of Child and Adolescent Health, University of Cape Town, Cape Town, South Africa, ‡Environmental Health Unit, South African Medical Research Council, Parow, South Africa

Table 1. The effect of HIV on the anthropometric status of children before starting antiretroviral therapy (Reddi et al. 2007)

Anthropometric indices	Number (%)
Moderate or severe stunting ($n = 406$)	271 (66.7)
Moderate or severe underweight ($n = 408$)	232 (56.9)
Moderate or severe wasting ($n = 390$)	81 (20.8)

n = denominator; for stunting, underweight and wasting: Z-score < –2 is moderate and <–3 is severe.

Table 2. Changes in growth in HIV-infected children <15 years after 1 year of antiretroviral therapy (Reddi et al. 2007)

Parameter	Baseline number (%)	1 year number (%)
Wasting ($n = 254$)	52 (20.5)	6 (2.4)
Underweight ($n = 266$)	149 (56.0)	51 (18.2)
Stunting ($n = 264$)	178 (67.4)	123 (46.6)

Maternal and Child Nutrition (2007), 3, pp. 322–333

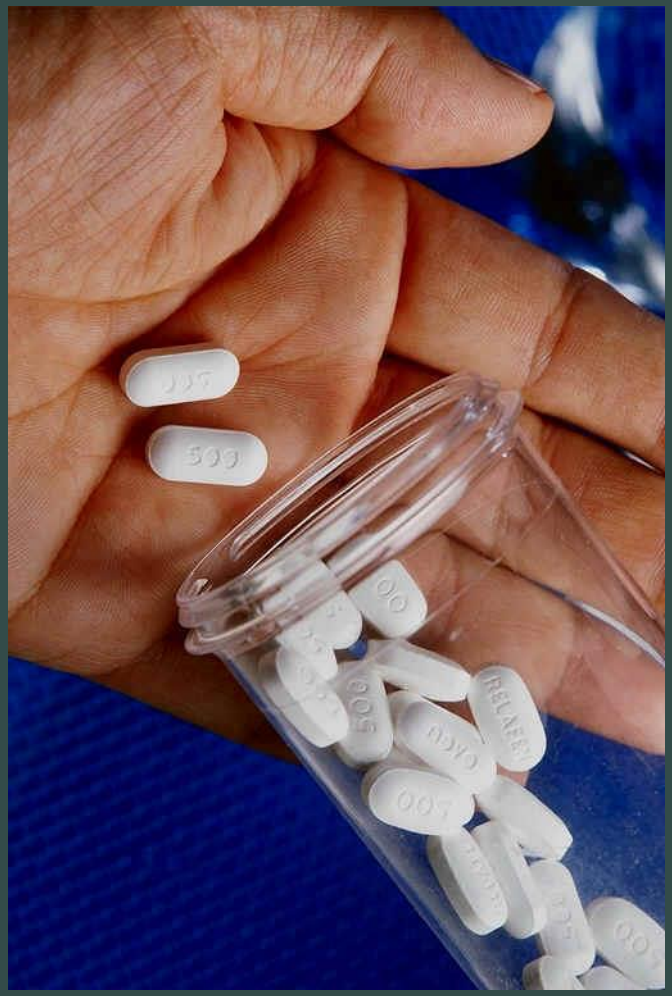
Lipodistrofia e SIDA

Jacqueline Pontes Monteiro

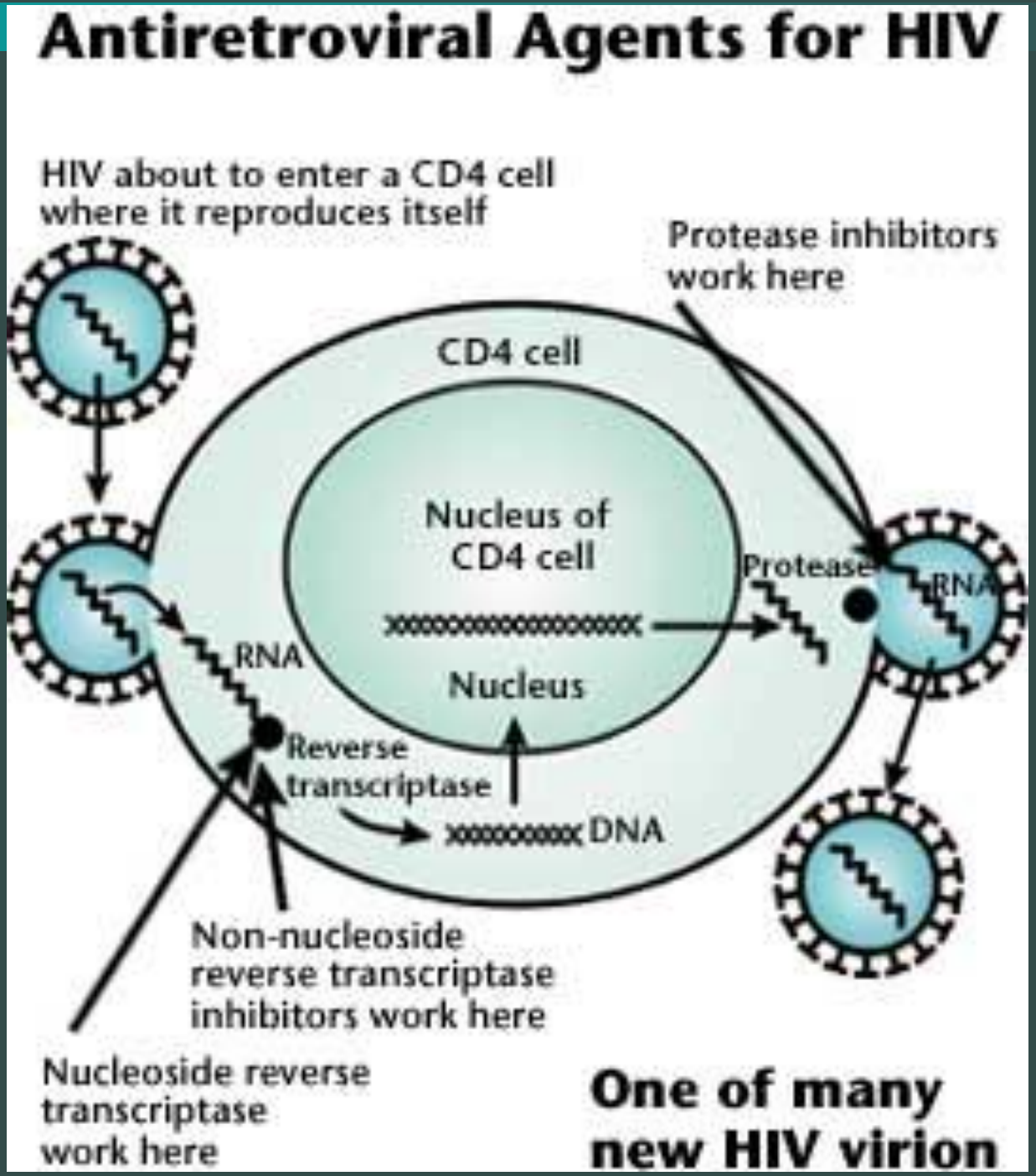
jacque@fmrp.usp.br

Inibidores de protease

- Inibe protease do vírus da imunodeficiência humana (maturação do vírus)
- Indinavir, nelfinavir, ritonavir, saquinavir



Antiretroviral Agents for HIV



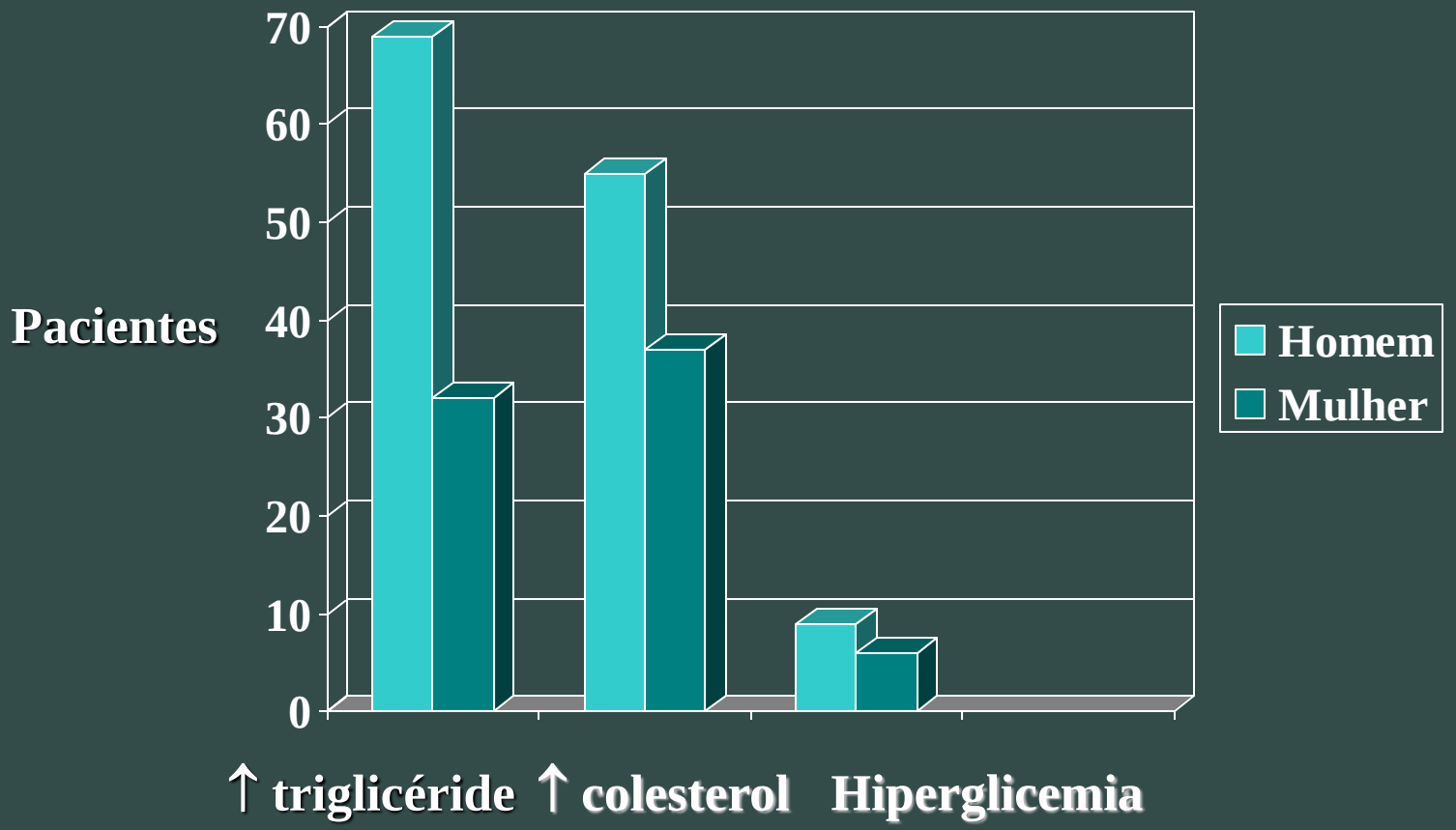
A selection of HIV / AIDS Antiretroviral drugs

Terapia antiretroviral (HAART) ↓ mortalidade e morbidade de pacientes HIV-positivos; ↑ peso e qualidade de vida

Terapia antiretroviral e alterações metabólicas (hiperglicemia, hiperlipemia e lipodistrofia)

Shevitz A et al., AIDS 2001

Lipodistrofia – homem e mulher



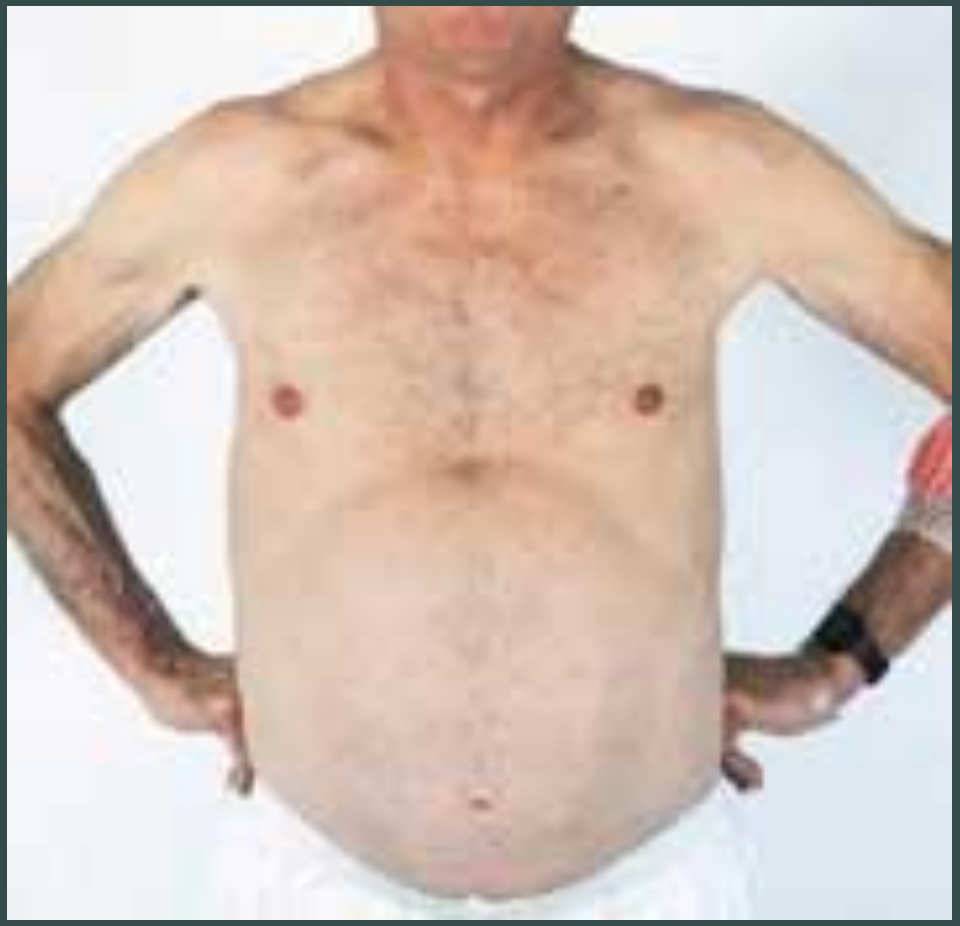
Muurahainem N., et al. AIDS 2000

HIV e metabolismo lipídico

Inibidor de protease e inibidor de transcriptase reversa

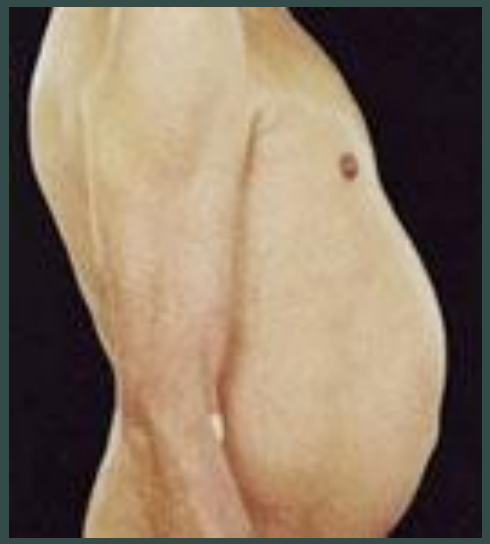
- **↑ Triglicéride e colesterol**
- **Estavudina e dideoxinosina; Ritonavir ↔ ↑ Triglicéride (> 1000mg/dl)**
- **Ritonavir → dislipidemia em duas semanas - ↑ colesterol em 24% e triglicéride em 137%**
- **↑ LDL (27% de aumento) e ↓ HDL**
- **Prevalência de dislipidemia (HAART) – 47 – 57%**

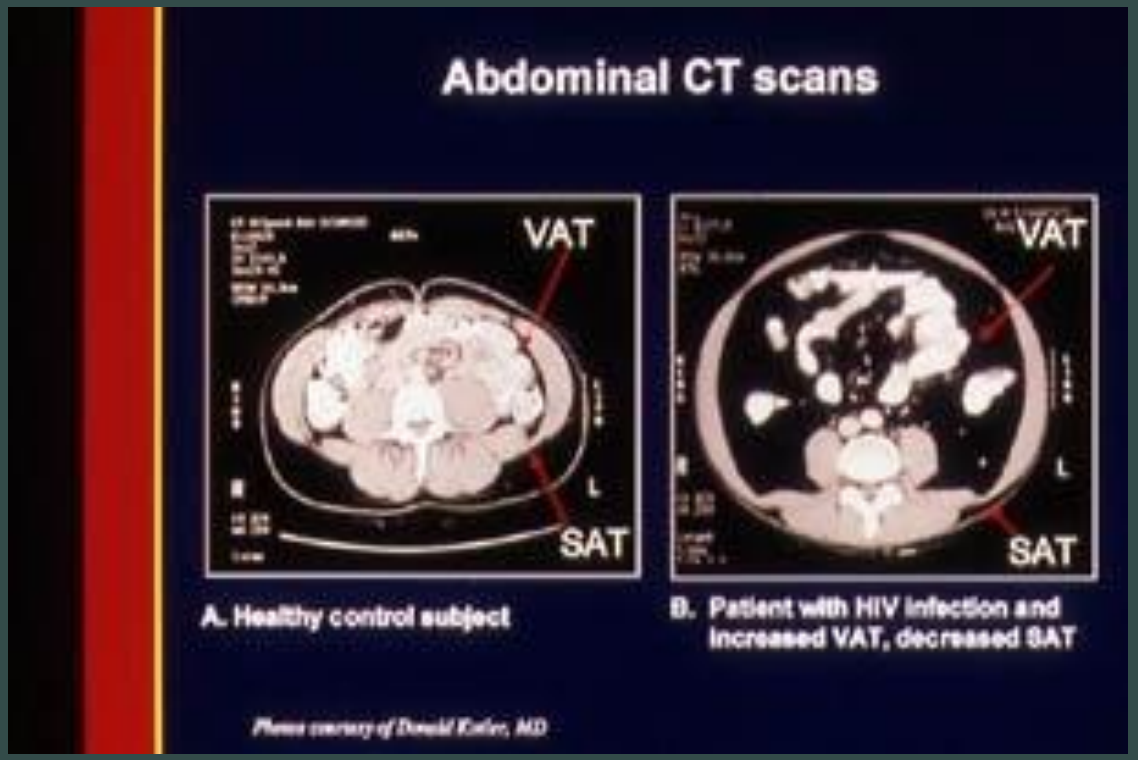
Síndrome da Lipodistrofia



Única síndrome com múltiplos componentes?

Síndrome da Lipodistrofia

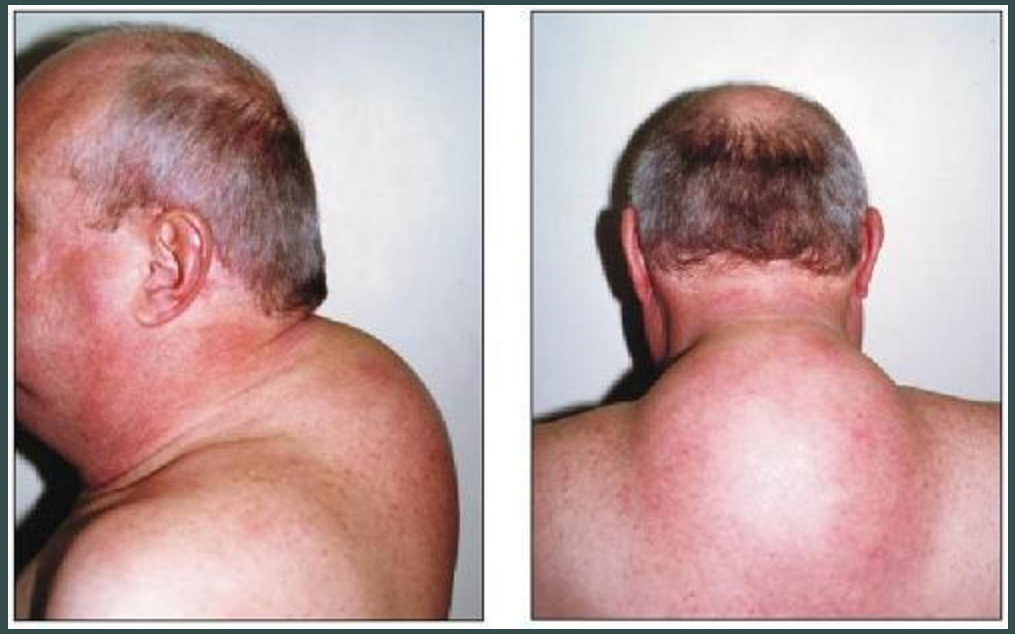


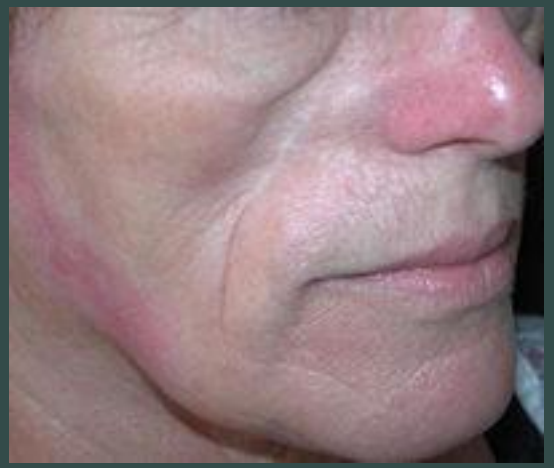


- ↑ gordura visceral (adipogênese e lipogênese)
- ↑ circunferência abdominal e gordura dorsocervical

Shevitz A et al., AIDS 2001

Síndrome da Lipodistrofia

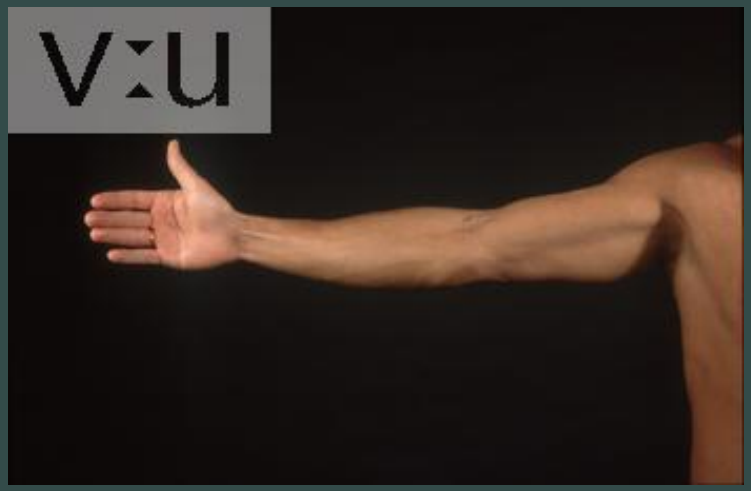




- ↑ circunferência abdominal e gordura dorsocervical
- Lipoatrofia de face, braços, pernas, nádegas (atrofia celular, apoptose)

Shevitz A et al., AIDS 2001

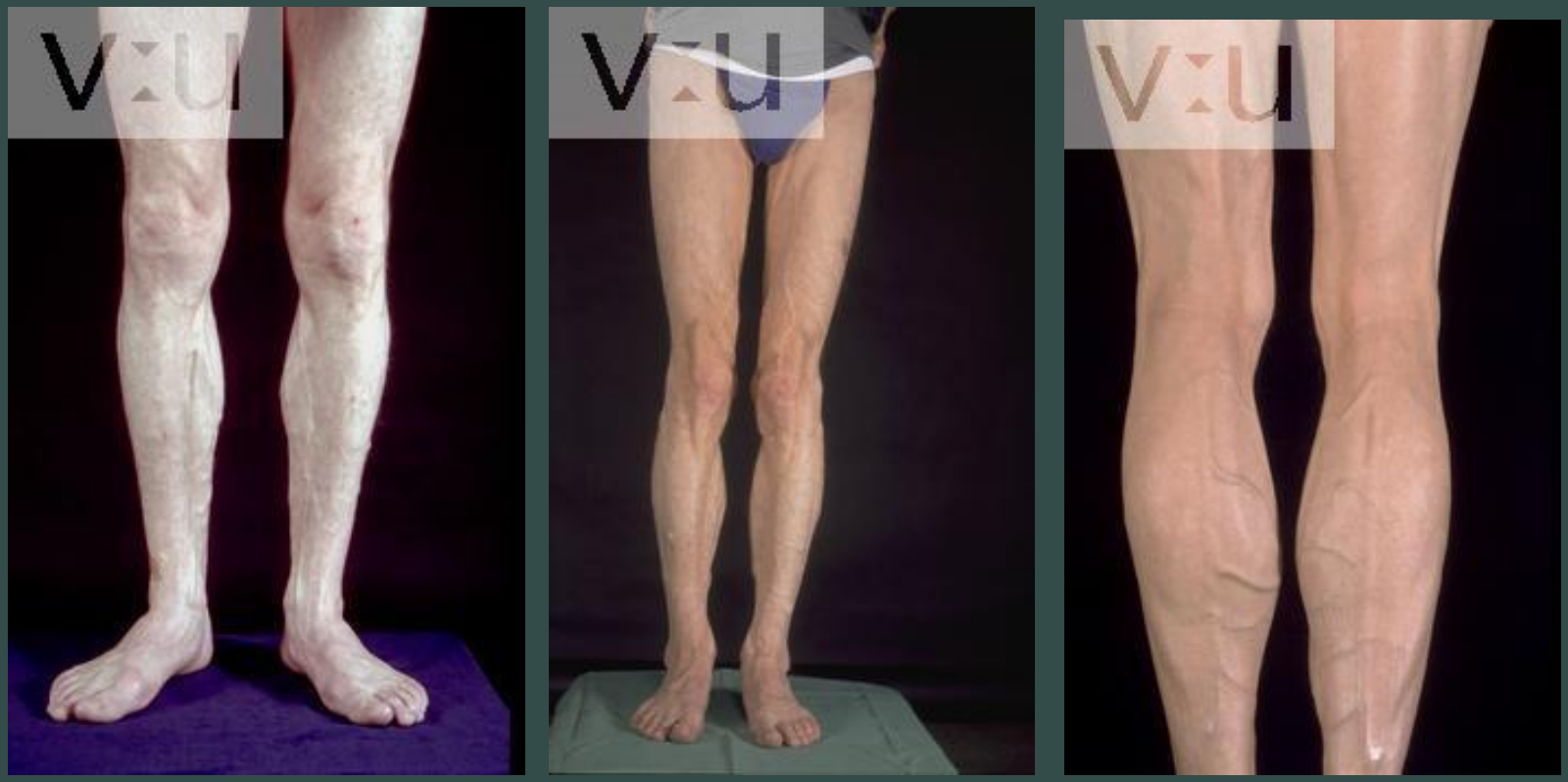
Síndrome da Lipodistrofia



- Lipoatrofia de face, braços, pernas, nádegas (atrofia celular, apoptose)

Shevitz A et al., AIDS 2001

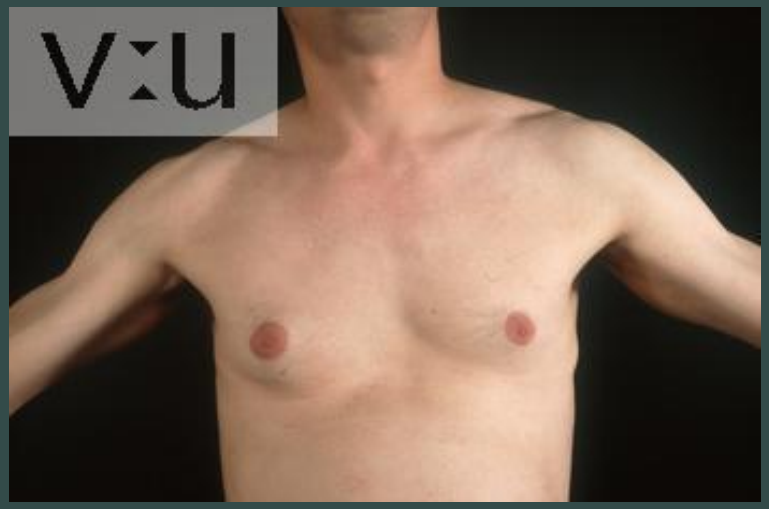
Síndrome da Lipodistrofia

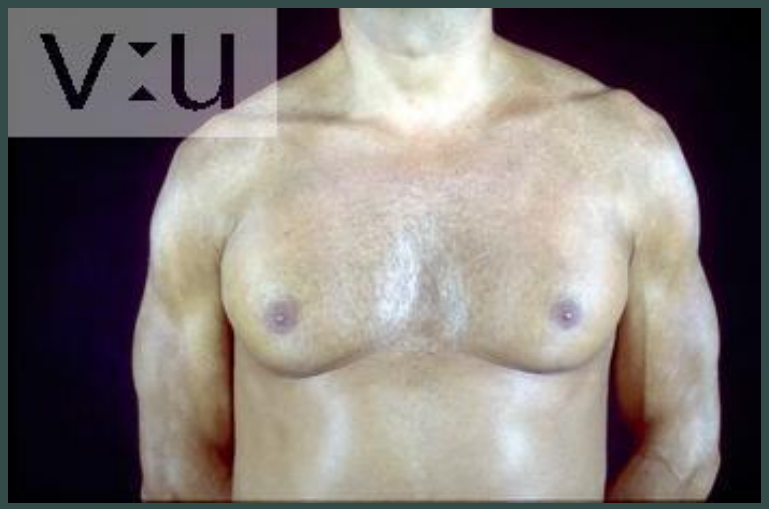


- Lipoatrofia de face, braços, pernas, nádegas (atrofia celular, apoptose)

Shevitz A et al., AIDS 2001

Síndrome da Lipodistrofia





↑ mama

Shevitz A et al., AIDS 2001

HIV e metabolismo lipídico

Dieta

- ↓ lipídios totais (não menos do que 20%)
- ↓ carboidrato (50 – 55% VCT)
- ↑ fibras (20 – 25g/dia)
- ↓ ácido graxo saturado (< 10%) e ↑ monoinsaturado (> 10%)
- ↓ consumo de álcool
- Ômega 3; 1,7g/dia – hipertrigliceridemia (> 1000mg/dl)

ADA REPORTS

J Am Diet Assoc. 2004;104: 1425-1441.

Dubé MP et al., Clinical Infectious Diseases 2000

Lipodistrofia e Sugestão de Pirâmide

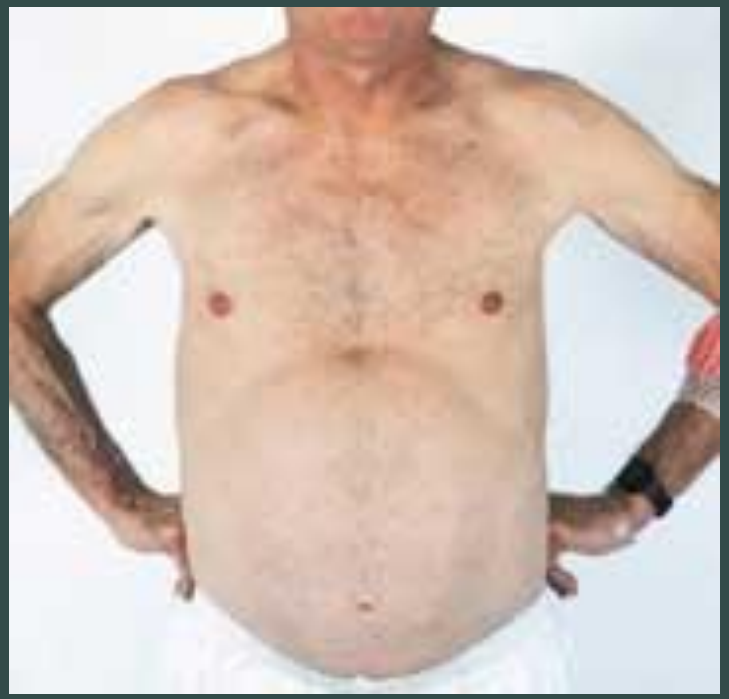
ADA REPORTS

J Am Diet Assoc. 2004;104: 1425-1441.

Perfil da ingestão alimentar – ADIS – FMRP - USP

Grupo	Encontrado	Padrão
Cereais/massas	3x/dia	Consumo moderado
Legume/verdura	< 2x/semana	1 – 3x/dia
Leite	1x/semana	1 – 2x/dia
Fritura	1x/dia	Moderado
Doces	1x/semana	Moderado
Frutas	< 2x/semana	2 – 3 porções

O aconselhamento nutricional é eficaz na síndrome da lipodistrofia da AIDS?



HIV e metabolismo lipídico

Atividade física

- ↓ lipídios totais e LDL
- ↑ consumo de glicose
- ↑ HDL
- ↓ adiposidade visceral

Shevitz A et al., AIDS 2001

HIV e metabolismo lipídico em pediatria

Lipodistrofia

- É evidente?
- Alteração na dieta oral tem algum impacto no estado nutricional?

Revista da Sociedade Brasileira de Medicina Tropical --(-):, ------, XXXX

Article/Artigo

Nutritional assessment and lipid profile in HIV-infected children and adolescents treated with highly active antiretroviral therapy

Avaliação nutricional e do perfil lipídico em crianças e adolescentes infectadas pelo HIV tratadas com terapia antirretroviral de alta potência

Marina Hjertquist Tremeschin[1], Daniela Saes Sartorelli[2], Maria Célia Cervi[1], Bento Vidal de Moura Negrini[1], Roberta Garcia Salomão[1] and Jacqueline Pontes Monteiro[1]

TABLE 1 - Clinical and demographic data of children and adolescents distributed according to type and time of antiretroviral therapy (ART) in the beginning of the study and after twelve months follow-up.

Parameters	Group 1(n = 17)		Group 2(n = 9)		Group 3(n = 9)		Group 4(n = 16)		p-value	
	A	B	A	B	A	B	A	B	A	B
Age (months)	116 (82-180)	130 (92-192)	140 (73-187)	151 (86-202)	126 (60-195)	136 (74-208)	120.5 (48-192)	135 (60-204)	0.599	0.634
Viral load (cells/mm^3)	2,878 (49-2466)	2,399.5 (49-48,477)	556 (49-38,929)	49 (49-144,362)	12,775 (232-10,999)	3,904 (49-91,438)	-	-	0.210	0.290
CD4/CD8 (cells/mm^3)	0.425 (0.19-1.18)	0.53 (0.11-1.06)	0.72 (0.15-1.02)	0.63 (0.17-1.08)	0.33 (0.04-0.41)	0.37 (0.08-1.11)	-	-	0.019‡	0.217
CD4 (cells/mm^3)	574.5 (17-816)	730 (230-1,089)	681 (112-1,032)	821 (68-1,083)	396 (13-654)	406 (103-1,584)	-	-	0.047‡	0.530
CD8 (cells/mm^3)	1,466 (352-2,497)	1,262 (576-2,905)	936 (349-4,249)	1,316 (1,004-3,000)	1,182 (345-3,035)	1,105 (637-3,503)	-	-	0.314	0.782
Time of ATR (months)	102 (12-143)	115 (24-156)	86 (70-156)	100 (83-171)	84 (0.13-168)	93 (9-181)	-	-	0.613	0.575
Time of PI (months)	-	-	27 (5-86)	39 (20-100)	1 (0.13-2)	11 (9-14)	-	-	0.000‡	0.000*
Total cholesterol (mg/dl)	125 (100-202)	131 (91-209)	161 (129-236)	165 (110-215)	166 (103-213)	156.5 (107-202)	148.5 (101-200)	154 (95-203)	0.059	0.169
Triglycerides (mg/dl)	94 (40-197)	79 (55-286)	114 (43-336)	96 (42-216)	136 (63-271)	140 (73-273)	54.5 (20-162)	67.5 (33-117)	0.003**	0.004***
HDL cholesterol (mg/dl)	39 (21-59)	36 (27-58)	32 (26-47)	44 (19-54)	34 (21-52)	36 (23-43)	42 (32-68)	49.5 (34-69)	0.518	0.004****
LDL cholesterol (mg/dl)	69 (57-146)	74.5 (42-127)	74 (55-96)	100 (54-140)	109 (60-133)	100 (55-124)	85 (48-137)	83 (31-148)	0.302	0.219
AUQEI (counts)	58 (46-68)	56 (45-71)	56 (39-62)	54 (45-73)	54 (43-62)	57 (47-66)	53.5 (40-66)	54 (44-65)	0.280	0.564

Column A: dates at the onset of the study, column B: dates after twelve months follow-up, CD4: Lymphocyte T CD4 count, CD8: lymphocyte T CD8 count, serum HDL: high density lipoprotein, serum LDL: low density lipoprotein, AUQEI: Quality of life questionnaire, ‡ group 2 bigger than 3, *group 2 different from group 3, **group 4 different from groups 2 and 3,***group 3 different from group 4, ****group 4 different from groups 1 and 3.

ATR: antiretroviral therapy; PI: protease inhibitor.

participate. The participants were divided into 4 groups of patients on the basis of the type of HAART being used: group 1, patients using nucleoside reverse transcriptase inhibitors or non-nucleoside reverse transcriptase inhibitors; group 2, patients using protease inhibitor (PI) for more than two months; group 3, patients using protease inhibitor for up to two months; and group 4, paired HIV-negative healthy children and adolescents.

TABLE 2 - Anthropometric data of children and adolescents distributed according to type and time of antiretroviral therapy (ART) at the beginning of the study and after twelve months follow-up.

Parameters	Group 1 (n = 17)		Group 2(n = 9)		Group 3(n = 9)		Group 4(n = 16)		p-value	
	A	B	A	B	A	B	A	B	A	B
Weight (Kg)	31.3 (19.6–49.8)	39 (21–55)	29.7 (14.5–45.6)	35.2 (16.6–51)	25 (16.6–50.9)	27.9 (20–53.1)	36.75 (16.9–73.8)	42.4 (9–70.3)	0.047*	0.531
Z score weight	-0.41 ±1.16	-0.51 ±1.21	-2.0±1.38	-1.97±1.32	-1.60±1.11	-1.35±0.84	0.19±0.91	0.2±0.95	0.001**	0.001**
Height (cm)	132 (114.5–166)	142.5 (118.5–170)	137 (105–159)	145.5 (110.5–163)	127.5 (105.5–158)	134 (112-163.5)	142.5 (104.5-164.5)	149.3 (111.5-66.5)	0.550	0.587
Z score height	-0.66 ±1.08	-0.66±0.94	- 1.36±0.93	-1.19±0.88	-1.6±1.1	-1.45±1.1	0.74±1.1	0.57±1.1	0.000**	0.000**
Body mass index (% of adequacy)	101 (80.22-141.46)	99 (80–148)	91.43 (74.70–99.87)	91 (67–100)	91.05 (85.6–101.5)	97 (82–109)	104.06 (79.8–151.5)	101 (79–156)	0.003†	0.036†
Waist circumference (cm)	61.5 (49–77)	65 (52–77)	57 (46.5–68.5)	63 (48–69)	61 (52–73.1)	60 (54.4–71.3)	62 (48.5–80)	62.75 (48.6–75.8)	0.509	0.516
Tríceps skinfold thickness (% of adequacy)	68 (33.19–126.6)	77 (44–205)	45.49 (32.08–79.9)	60 (42–103)	60.41 (34.48–123)	84 (59.2–121)	121.73 (72.8-173.22)	106 (75–202)	0.000*	0.002††
Subscapular skinfold thickness (% of adequacy)	73.68 (33.33–250)	108 (71–250)	55.49 (38.46–125)	86 (56–133)	87.5 (41.6–107.69	88 (80–167)	152.77 (57.1–400)	142 (85–367)	0.000**	0.001****
Mid-arm-muscle-circumference (% of adequacy)	100.5 (86.6–114.4)	96.1 (83–119)	94.4 (78.2–111.48)	91.4 (67.27-108.84)	89.7 (75.38–99.6)	86.76 (78.2-102.6)	94.24 (54.39–143.3)	100.3 (79.76–133)	0.125	0.006****
Height/age (%)	98.76 (92.4–107.0)	98 (89–104)	94.9 (88.1–101.57)	94 (89–102)	95.04 (87.46-98.55)	96 (86–102)	105.33 (95–115.34)	102 (95–114)	0.000**	0.001**
Weight/height (%)	99.0 (85.59-149.18)	100 (84–147)	91.58 (78.2–99.16)	91 (73–99)	97 (87.9–108.3)	99 (85–112)	91.53 (82.5–135)	98 (85–140)	0.093	0.033***

Column A: dates at the onset of the study, Column B: dates after twelve months follow-up, †group 2 different from groups 1 and 4, ††group 4 different from groups 1 and 2, *The four groups are statistically different, **group 4 different from groups 1. 2 and 3, ***group 2 different from group 1, ****group 4 different from groups 2 and 3.

TABLE 3 - Bioelectrical impedance analyses of children and adolescents distributed according to type and time of antiretroviral therapy (ART) at the beginning of the study and after twelve months follow-up.

Parameters	Group 1(n = 17)	Group 2(n = 9)	Group 3(n = 9)	Group 4(n = 16)	p-value
At the beginningof study					
lean body mass (Kg)	24.1 (14.3–39.3)	24.2 (12.6–34.5)	20.1 (12.7–36.4)	28 (14.2–49.3)	0.544
fat mass (Kg)	6.6 (3.1–16.3)	5.3 (1.9–11.1)	4.9 (3.8–15.1)	6.9 (1.8–24.5)	0.444
body cell mass (Kg)	11.95 (7.6–19.3)	11.1 (6.4–16.4)	9.7 (6.5–18.2)	13.95 (7–24.1)	0.460
total body water (Liters)	18.2 (10.6–28.8)	17.7 (10.2–25.1)	15.2 (9.6–27.3)	20.45 (11.5–34.9)	0.431
After 12 months of study					
lean body mass (Kg)	26.6 (15.7–44.9)	28.4 (14–35.9)	23 (15.5–46.1)	32.55 (15.5–48)	0.636
fat mass (Kg)	7.1 (3.9–13.7)	4.9 (2.6–15.1)	5.75 (3.2–13.3)	7.05(2.7–22.9)	0.588
body cell mass (Kg)	13 (8.2–22.8)	13.1 (7.1–17.5)	11.35 (7.9–23.9)	15.6 (7.9–25.8)	0.489
total body water (Liters)	20 (11–33)	21(11–25.3)	17.15 (11.9–34.2)	23.9 (12.2–36)	0.608

TABLE 4 - Regression coefficients β 1 (95% confidence interval) for the difference in quality of life according to fat mass alteration in HIV positive children after twelve months follow-up.

	Alteration in quality of life		
Difference in fat mass	β	CI 95%	p
Model 1*	0.406	0.195 - 2.848	0.026
Model 2**	0.410	0.059 - 3.018	0.042
Model 3 ***	0.041	0.025 - 3.049	0.047
Model 4 †	0.433	0.129 - 3.104	0.034

*Model 1: crude analysis, **Model 2: adjusted for age and sex, ***Model 3: model 2 + Time using protease inhibitor, †Model 4: model 2 + time using antiretroviral therapy.

Energy and macronutrient intakes were similar between the groups at all time points during the study, but a higher lipid intake (% of energy intake) occurred compared to the recommended intake in all groups. The mean energy intake at the onset of the study and at the end of study was, respectively, 2,413kcal (1,586 - 5,806) and 2,148kcal (1,289 - 4,166). The mean percentage of lipid calories at the onset and end of the study was, respectively, 37.8% (28.6 - 49.2) and 38.5% (28 - 48.6). Age and weight did not interfere with the energy intake results, according to ANCOVA analyses (at the onset: age $p = 0.39$, weight $p = 0.72$; at the end: age $p = 0.94$, weight $p = 0.49$).

Rev 7.51n/W (Jan 20 2003)
Clinics 13-cln-OA-0622 25/5/11 21:13:36

CLINICS 2011;000(000):000-000 DOI:10.1590/S1807-59322011000600013

CLINICAL SCIENCE

Nutritional status and lipid profile of HIV-positive children and adolescents using antiretroviral therapy

Patricia Viganó Contri,[I] Érica Miranda Berchielli,[I] Marina Hjertquist Tremeschin,[I] Bento Vidal de Moura Negrini,[I] Roberta Garcia Salomão,[I] Jacqueline Pontes Monteiro[II]

[I] Nutrition and Metabolism, Medical School of Ribeirão Preto, University of São Paulo Department of Pediatrics, Ribeirão Preto, São Paulo/Brazil. [II] Clínica Médica, Medical School of Ribeirão Preto, University of São Paulo, Ribeirão Preto, SP/Brazil.

Table 5 - Lipid profile of HIV-positive children and adolescents using and not using PI: analysis between groups and longitudinal analysis.

Lipid profile	G1 (PI)		G2 (No PI)	
	M1	M2	M1	M2
Triglycerides* (mg/dl)	153 (30–344)	138 (58–378)	76 (29–378)	76 (29–378)
Cholesterol (mg/dl)	161 (87–230)	161 (87–225)	142 (98–210)	142 (91–210)
HDL-cholesterol (mg/dl)	37 (14–76)	40 (14–52)	39 (30–59)	40 (30–52)
Non-HDL-cholesterol* (mg/dl)	122 (98–170)	119 (63–170)	93 (61–125)	89 (58–161)
LDL-cholesterol (mg/dl)	91 (40–123)	104† (40–142)	82 (47–121)	82 (42–145)

G1: group using PI; G2: group not using PI.
M1: initial moment; M2: final moment.
HDL: high density lipoprotein; LDL: low density lipoprotein.
*Values were statistically different between groups of children and adolescents using and not using PI at both M1 and M2: $p < 0.05$.
†Values were statistically different between groups of children and adolescents using and not using PI only at M2: $p < 0.05$.


Obrigada...

A Systematic Review of Nutritional Supplementation in HIV-Infected Children in Resource-Limited Settings

Megan S. McHenry, MD[1], Avika Dixit, MBBS, MPH[1], and Rachel C. Vreeman, MD, MS[1,2]

Abstract

Background: In resource-limited settings, malnutrition is the major cause of death in young children, but the precise benefits of nutritional supplementation for HIV-infected children are not well understood. **Methods:** Two researchers reviewed studies conducted in low- or middle-income countries that involved macro- and micronutrient supplementation in HIV-infected individuals ≤18 years. **Results:** Fifteen studies focused on micronutrients, including vitamin A, zinc, multivitamins, and multiple-micronutrient supplementation. The 8 macronutrient studies focused on ready-to-use foods (4 studies), spirulina, whey protein, general food rations, and F75 and F100 starter formulas. Vitamin A was associated with improved mortality rates, ranging from 28% to 63%. Multiple-micronutrient supplementations were not associated with improvement of measured health outcomes. Ready-to-use foods were associated with improvement in certain anthropometrics. **Conclusion:** Periodic vitamin A supplementation is associated with reduced mortality. Macronutrient supplementation is linked to improved anthropometrics. More research is needed to determine how nutritional supplementation benefits this particularly vulnerable population.

J Int Assoc Provid AIDS Care. 2014 Jun 18. pii: 2325957414539044

Table 2. Study Outcomes by Intervention Type.

Source	Intervention Type	Outcome
Coutsoudis, et al[11]	Vitamin A	For HIV-infected patients, morbidity associated with diarrhea was significantly reduced in supplemented groups
Fawzi, et al[12]; Fawzi, et al[13]; Villamor, et al[14]	Vitamin A	Reduction in all-cause mortality by 63%in HIV-infected patients and AIDS-related deaths by 68% Nonsignificant reduction in cough and tachypnea and a nonsignificant increase in acute diarrhea Significant increase in height, in particular in children between 6 and 18 months of age
Humphrey, et al[15]; Miller, et al[16]	Vitamin A	For infants who were HIV PCR negative at baseline and positive at 6 weeks, supplementation reduced mortality; maternal supplementation not associated with significant effects; HIV negative infants given vitamin A had 2-fold higher mortality HIV-infected children were noted to have increased risk of anemia; however, intervention had no effect on anemia or hemoglobin
Hussey, et al[17]	Vitamin A	Increased TCD4 counts 4 weeks after supplementation
Semba, et al[23]	Vitamin A	Mortality rates were lower when supplemented (relative risk of 0.54); decreased prevalence of cough and chronic diarrhea
Bobat, et al[10]	Zinc	No significant change in HIV-1 viral load, TCD4 counts, or median hemoglobin concentration; those given supplements were less likely to get watery diarrhea; increased weight gain in children receiving zinc
Srinivasan, et al[24]	Zinc	Mortality rate was decreased in HIV-infected patients receiving zinc compared with those receiving placebo; no other significant effect on respiratory rate, temperature, or oxygen saturation was found
Mda, et al[20]	Multivitamin	No change in anthropometric indices and micronutrient concentrations; shorter duration of hospitalizations in those with intervention
Luabeya, et al[18]; Chhagan, et al[19]	Multiple-micronutrient supplementation	No significant difference in overall diarrhea among treatment arms; HIV-infected children receiving zinc or multivitamin had higher incidence of persistent and severe diarrhea than vitamin A supplemented children No differences between treatment arms in the prevalence of diarrhea or pneumonia
Ndeezi, et al[21]; Ndeezi, et al[22]	Multiple-micronutrient supplementation	No significant change in mortality, growth, or TCD4 counts with intervention No significant difference in incidence or prevalence of diarrhea with intervention
Choto, et al[26]	Nutrition Mix-1A	Significant weight gain over the 10-month study period (3-6 kg); subjective decrease in episodes of illness reported by mothers
Fergusson, et al[25]	F75/F100	All children achieved nutritional recovery (>85% weight-for-height and no edema)
Rollins, et al[30]	Enhanced formula	Significant weight gain was noted in the first 8 weeks with the enhanced formula ($P < .0001$) with similar weight gain compared to standard formula thereafter; no significant difference in TCD4 counts
Kundu, et al[27]	Food supplementation	Significant improvement in clinic adherence along with increased mean clinic visit and mean TCD4 count with incentive; this also correlated well with number of visits, which in turn had strong correlation with weight gain, episodes of AIDS-defining illnesses, and hospitalizations
Moreno, et al[28]	Whey protein	No significant change in hemoglobin, leukocytes, platelets, MCV; significant decreased in the TCD8 count in those receiving supplementation that contributed to a nonsignificant increase in TCD4/TCD8 counts; lower occurrence of associated coinfections was also observed
Simpore, et al[31]	Spirulina	Weight gain of 15 g/d in HIV-infected patients when taken daily; decreased level of anemia
Ndekha, et al[29]	Ready-to-use therapeutic foods	Half of the children achieved complete anthropometric recovery with any home-based therapy; therapy with RUTF reached this goal more frequently and quickly when compared to RUFT supplement or maize/soy flour
Sunguya, et al[32]	Ready-to-use therapeutic foods	Less likely to have underweight and wasting compared to controls; when treated for at least 4 months, were less likely to be underweight, wasted, and stunted

Abbreviations: PCR, polymerase chain reaction; RUTF, ready-to-use therapeutic food; MCV, mean corpuscular volume.

Original article

Assessment of antioxidants status and superoxide dismutase activity in HIV-infected children

Camila Pugliese[a], *Rose Vega Patin*[a], *Cecilia Zanin Palchetti*[a], *Cristiane Chiantelli Claudio*[a], *Aída de Fátima Thomé Barbosa Gouvêa*[b], *Regina Célia de Menezes Succi*[b], *Olga Maria Silverio Amancio*[a], *Silvia Maria Franciscato Cozzolino*[c], *Fernanda Luisa Ceragioli Oliveira*[a,*]

Objective: This study aims to assess the nutritional status of selenium, copper and zinc; and also the erythrocyte superoxide dismutase activity of HIV-infected children compared to a control group.

Methods: A cross-sectional study was carried out with prepubertal HIV-infected children ($n = 51$) and their healthy siblings ($n = 32$). All biochemical measurements including plasma selenium, serum copper levels, serum and erythrocyte zinc levels and erythrocyte superoxide dismutase activity were evaluated according to dietary, clinical and biochemical parameters.

Results: Compared to the control group, the HIV-infected children had lower z-score values for height-for-age ($p = 0.0006$), higher prevalence of stunting (11.8%) ($p = 0.047$), lower selenium levels ($p = 0.0006$) and higher copper levels ($p = 0.019$). No difference was found concerning superoxide dismutase activity ($p > 0.05$). The HIV-infected group presented a higher proportion (45.1%) of children with zinc intakes below the estimated average requirement ($p = 0.014$); however, no association with zinc biochemical parameters was found.

Conclusion: HIV-infected children have an inadequate selenium and copper nutritional status, which could influence the progression to AIDS. An adequate micronutrient status could improve the clinical conditions in these patients and minimize free radical production and cellular oxidative stress.

BRAZ J INFECT DIS. 2014;18(5):481–486

BRAZ J INFECT DIS. 2014;18(4):394–399

Prevalence of lipodystrophy and risk factors for dyslipidemia in HIV-infected children in Brazil

Luanda Papi[a], *Ana Carolina G.B. Menezes*[b], *Hélio Rocha*[c], *Thalita F. Abreu*[c], *Ricardo Hugo de Oliveira*[c], *Ana Cristina C. Frota*[c], *Lucia de A. Evangelista*[c], *Cristina B. Hofer*[a,*]

A B S T R A C T

The aim of present study was to describe the frequency of lipodystrophy syndrome associated with HIV (LSHIV) and factors associated with dyslipidemia in Brazilian HIV infected children.

HIV infected children on antiretroviral treatment were evaluated (nutritional assessment, physical examination, and laboratory tests) in this cross-sectional study. Univariate analysis was performed using Mann–Whitney test or Fisher's exact test followed by logistic regression analysis. Presence of dyslipidemia (fasting cholesterol >200 mg/dl or triglycerides >130 mg/dl) was the dependent variable.

90 children were enrolled. The mean age was 10.6 years (3–16 years), and 52 (58%) were female. LSHIV was detected in 46 children (51%). Factors independently associated with dyslipidemia were: low intake of vegetables/fruits (OR = 3.47, 95%CI = 1.04–11.55), current use of lopinavir/ritonavir (OR = 2.91, 95%CI = 1.11–7.67). In conclusion, LSHIV was frequently observed; inadequate dietary intake of sugars and fats, as well as current use of lopinavir/ritonavir was associated with dyslipidemia.

Table 2 – Multivariate analysis – factors associated with LSHIV.[a]

	OR[c]	95%CI[d]	p-Value
Income – per person (minimum Brazilian wage) salary wages (mean)	0.96	0.77–1.21	0.74
Nadir % CD4+ per cell	0.96	0.92–1.00	0.08
Inadequate intake of vegetables/fruits	1.81	0.56–5.84	0.32
Inadequate intake of sugars and fat	3.05	1.10–8.46	0.03
On LPV/r[b]	2.51	0.94–6.75	0.06
Admitted to the hospital in the last year	1.87	0.45–7.74	0.39
Current AST[e] – per Unit/mL	1.05	1.00–1.11	0.05

[a] LSHIV: lipodystrophy syndrome associated with HIV.
[b] Lopinavir/ritonavir.
[c] Odds ratio.
[d] 95% confidence interval.
[e] Aspartate aminotransferase.

Micronutrient supplementation for children with HIV infection

James H Irlam[1], Nandi Siegfried[2], Marianne E Visser[3], Nigel C Rollins[4,5]

Background

Micronutrient deficiencies are widespread and compound the effects of HIV disease in children, especially in poor communities. Micronutrient supplements may be effective and safe in reducing the burden of HIV disease. This review is an update of an earlier Cochrane review of micronutrient supplementation in children and adults which found that vitamin A and zinc are beneficial and safe in children exposed to HIV and living with HIV infection (Irlam 2010).

Objectives

To assess whether micronutrient supplements are effective and safe in reducing mortality and morbidity in children with HIV infection.

Search methods

The CENTRAL, EMBASE, and PubMed databases were searched for randomised controlled trials of micronutrient supplements (vitamins, trace elements, and combinations of these) using the search methods of the Cochrane HIV/AIDS Group.

Selection criteria

Randomised controlled trials were selected that compared the effects of micronutrient supplements with other supplements, or placebo or no treatment on the primary outcomes of mortality, morbidity, and HIV-related hospitalisations. Indicators of HIV disease progession, anthropometric measures, and any adverse effects of supplementation were secondary outcomes.

Data collection and analysis

Two reviewers independently screened and selected trials for inclusion, assessed the risk of bias using standardised criteria, and extracted data. Review Manager 5.1 was used to calculate the risk ratio (RR) for dichotomous data and the weighted mean difference (WMD) for continuous data, and to perform random effects meta-analysis where appropriate.

Editorial group: Cochrane HIV/AIDS Group.
Publication status and date: New, published in Issue 10, 2013.

Main results

We included three new studies in addition to the eight studies in the earlier version of the review (Irlam 2010). Eleven studies with a total of 2412 participants were therefore included: five trials of vitamin A, one trial of vitamin D, two trials of zinc, and three trials of multiple micronutrient supplements. All except one trial were conducted in African children.

Vitamin A halved all-cause mortality in a meta-analysis of three trials in African children, had inconsistent impacts on diarrhoeal and respiratory morbidity, and improved short-term growth in a Tanzanian trial. No significant adverse effects were reported.

A single small trial of vitamin D in North American adolescents and children demonstrated safety but no clinical benefits. Zinc supplements reduced diarrhoeal morbidity and had no adverse effects on disease progression in one small South African trial. Another trial in South African children with and without HIV infection did not show benefit from the the prophylactic use of zinc or multiple supplements versus vitamin A in the small subgroup of children with HIV infection.

Multiple micronutrient supplements at twice the RDA did not alter mortality, growth, or CD4 counts at 12 months in Ugandan children aged one to five years. Short-term supplementation until hospital discharge significantly reduced the duration of all hospital admissions in poorly nourished South African children, and supplementation for six months after discharge improved appetite and nutritional indicators.

Authors' conclusions

Vitamin A supplementation is beneficial and safe in children with HIV infection. Zinc is safe and appears to have similar benefits on diarrhoeal morbidity in children with HIV as in children without HIV infection. Multiple micronutrient supplements have some clinical benefit in poorly nourished children with HIV infection.

Further trials of single supplements (vitamin D, zinc, and selenium) are required to build the evidence base. The long-term effects and optimal composition and dosing of multiple micronutrient supplements require further investigation in children with diverse HIV disease status.

Impact of Multi-Micronutrient Supplementation on Growth and Morbidity of HIV-Infected South African Children

Siyazi Mda [1,2,*], Joop M. A. van Raaij [1], François P. R. de Villiers [2] and Frans J. Kok [1]

Abstract: Poor growth, micronutrient deficiencies and episodes of diarrhea and respiratory infections occur frequently in HIV-infected children. We investigated whether multi-micronutrient supplementation would improve the growth performance and reduce the number of episodes of diarrhea and/or of respiratory symptoms in HIV-infected children. In a double-blind randomized trial, HIV-infected South African children aged 4–24 months (n = 201) were assigned to receive multi-micronutrient supplements or placebo daily for six months. The children were assessed for respiratory symptoms or diarrhea bi-weekly; weights and heights were measured monthly. In total, 121 children completed the six month follow up study period (60%). A total of 43 children died; 27 of them had received supplements. This difference in mortality was not statistically significant ($p = 0.12$). Weight-for-height Z-scores improved significantly ($p < 0.05$) among children given supplements compared with those given placebo (0.40 (0.09–0.71)) *versus* −0.04 (−0.39–0.31) (mean (95% CI)). Height-for-age *Z*-scores did not improve in both treatment groups. The number of monthly episodes of diarrhea in the placebo group (0.36 (0.26–0.46)) was higher ($p = 0.09$) than in the supplement group (0.25 (0.17–0.33)) and the number of monthly episodes of respiratory symptoms was significantly higher ($p < 0.05$) among children on placebos (1.01 (0.83–1.79)) than those on supplements (0.66 (0.52–0.80)). Multi-micronutrient supplements significantly improved wasting and reduced the number of episodes of diarrhea and respiratory symptoms.

Nutrients **2013**, *5*, 4079-4092; doi:10.3390/nu5104079

Table 5. Diarrhea and respiratory symptom episodes per month of follow up.

Treatment Group	*n*	Age at Enrolment (months)	Number of Diarrheal Episodes per Month	Number of Episodes of Respiratory Symptoms per Month
Placebo	53	12.0 (10.3–13.7)	0.36 (0.26–0.46)	1.01 (0.83–1.19)
Supplement	52	13.7 (12.1–15.3)	0.25 (0.17–0.33) *	0.66 (0.52–0.80) #

Values presented as mean (95% CI) * Marginally significantly different from placebo group ($p = 0.09$); # Significantly different from placebo group ($p < 0.05$).

6. Conclusions

The improvement in growth performance (in weight but not height) and reduction in morbidity that was observed in this study suggests that micronutrient supplements are useful as adjunct therapy in HIV-infected children. While there was no effect on CD4 lymphocytes, there were no deleterious effects. At the time of conducting the study, ART was not widely available at the local hospital, but has since become available to an increasing number of children in sub-Saharan African countries. However, because ART is given to children with advanced HIV disease, micronutrient supplementation may be useful in those children who are as yet not eligible for ART. The effect of micronutrient supplementation in children who are on ART should also be investigated.

Indian J Med Res 141, January 2015, pp 10-12

Commentary

Health & nutritional status of HIV infected children

A multipronged strategy will be required to improve the nutritional status of HIV infected children. Given the high prevalence of undernutrition, the first step is to screen children for their nutritional status and treat all the undernourished children, not only the ones with severe acute malnutrition. Micronutrient deficiencies must be identified and treated. Some children who are not undernourished are likely to benefit from counselling regarding food intake and nutrition. As many of the families are impoverished, provision of food supplementation either from the programme or food security programme of the State may be beneficial. Early initiation and regular administration of HAART in whom it is indicated will also be beneficial in improving the nutritional status. As the HIV-infection is now a chronic condition, there is a need for evaluation of nutritional status and growth monitoring on an ongoing basis to identify abnormalities and treat early.

Lipodystrophy syndrome among HIV infected children on highly active antiretroviral therapy in northern India

* Euden Bhutia[1], Alok Hemal[1], Tribhuvan Pal Yadav[1], K.L Ramesh[2]

Abstract:

Background: It is estimated that about 2.5 million people are living with HIV infection in India. Although antiretroviral drugs have been able to reduce the mortality, these drugs have serious side effects one of which is lipodystrophy syndrome. Most of the drugs used in HAART viz, protease inhibitors, stavudine and nevirapine are associated with lipodystrophy. Hence we conducted this study to assess the prevalence of lipodystrophy in HIV infected children on HAART and its associated risk factors.

Materials and methods: A cross sectional study was conducted on 80 HIV infected children aged 2-18 years of age who were on stavudine based HAART for ≥2 years. These children were assessed for presence of lipodystrophy, its metabolic complications and associated risk factors.

Results: Lipodystrophy was observed in 33.7% of children with lipoatrophy being the commonest subtype followed by lipohypertrophy. Older age, increased duration of treatment and dyslipidaemia were found to be associated in patients with lipodystrophy than those without. On further multivariate analysis of independent risk factors only increased duration of treatment was significantly associated with lipodystrophy. No association was found with insulin resistance.

Conclusion: We observed that lipodystrophy is a common finding in HIV patients treated with HAART for long duration.

African Health sciences Vol 14 No. 2 June 2014

Pediatr Infect Dis J. 2015 February ; 34(2): e23–e31. doi:10.1097/INF.0000000000000491.

PREVALENCE OF LIPODYSTROPHY AND METABOLIC ABNORMALITIES IN HIV-INFECTED AFRICAN CHILDREN AFTER THREE YEARS ON FIRST-LINE ANTIRETROVIRAL THERAPY

Mutsawashe Bwakura-Dangarembizi, MMed[#1], Victor Musiime, PhD[#2,3], Alexander J Szubert, MSc[4], Andrew J. Prendergast, DPhil[4,5], Zvenyika Alfred Gomo, PhD[1], Margaret J Thomason, PhD[4], Cuthbert Musarurwa, MSc[1], Peter Mugyenyi, FRCP[2], Patricia Nahirya, MMed[6], Adeodata Kekitiinwa, MMed[7], Diana M. Gibb, MD[4], A. Sarah Walker, PhD[**,4], Kusum Nathoo, MRCP[**,1], and ARROW Trial Team

METHODS:
Three years after antiretroviral therapy (ART) initiation, body circumferences and skinfold thicknesses were measured (n = 590), and fasted lipid profile assayed (n = 325), in children from 2 ARROW trial centres in Uganda/Zimbabwe. Analyses compared randomization to long-term versus short-term versus no zidovudine from ART initiation [unadjusted; latter 2 groups receiving abacavir+lamivudine+non-nucleoside-reverse-transciptase-inhibitor (nNRTI) long-term], and nonrandomized (confounder-adjusted) receipt of nevirapine versus efavirenz.

RESULTS: Body circumferences and skinfold thicknesses were similar regardless of zidovudine exposure ($P > 0.1$), except for subscapular and supra-iliac skinfolds-for-age which were greater with long-term zidovudine ($0.006 < P < 0.047$).

Total and high-density lipoprotein (HDL)-cholesterol, HDL/triglyceride-ratio ($P < 0.0001$) and triglycerides ($P = 0.01$) were lower with long-term zidovudine. Low-density lipoprotein (LDL)-cholesterol was higher with efavirenz than nevirapine ($P < 0.001$). Most lipids remained within normal ranges (75% cholesterol, 85% LDL and 100% triglycerides) but more on long-term zidovudine (3 NRTI) had abnormal HDL-cholesterol (88% vs. 40% short/no-zidovudine, $P < 0.0001$). Only 8/579(1.4%) childrenhad clinical fat wasting (5 grade 1; 3 grade 2); 2(0.3%) had grade 1 fat accumulation.

CONCLUSIONS: Long-term zidovudine-based ART is associated with similar body circumferences and skinfold thicknesses to abacavir-based ART, with low rates of lipid abnormalities and clinical lipodystrophy, providing reassurance where national programs now recommend long-term zidovudine. Efavirenz and nevirapine were also similar; however, the higher LDL observed with efavirenz and lower HDL observed with zidovudine suggests that zidovudine+lamivudine+efavirenz should be investigated in future.