

Influence of Host Nutriome on Immunological Control of *Trypanosoma cruzi* Infection

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Introduction

- Host nutritional status may impact humoral & cellular mechanisms, modulating the immunologic control of parasitic infections
- Insufficient or surplus micronutrients can weaken the immune systems' function, resulting in poor immunologic control of protozoal infections
- Chagas disease, caused by *Trypanosoma cruzi*, is heavily influenced by the host's immune system, which can be modulated by the host's nutritional status
- To further understand this, we intend to study the relationship between tissue-based protozoal infections & host micronutrient status

Methods

- Combinations of search terms such as Parasite* AND (Immunology OR Immunity OR Immune System OR Immune Function OR Immune Impairment OR Immune Response OR Immune Status) from database inception to March 29, 2022 were searched in five electronic databases
- Screening was performed independently by two reviewers with discrepancies arbitrated by a tertiary reviewer

Included	Excluded
Systematic reviews	Review articles
Randomized controlled trials	Case reports
Clinical trials	Case series (n<4)
Cohort studies	Editorials
Observational studies	Conference proceedings
Case-control studies	Animal studies
Case series (n>5)	Trial descriptions only

Table 1. Inclusion and exclusion criteria implemented during title and abstract screening

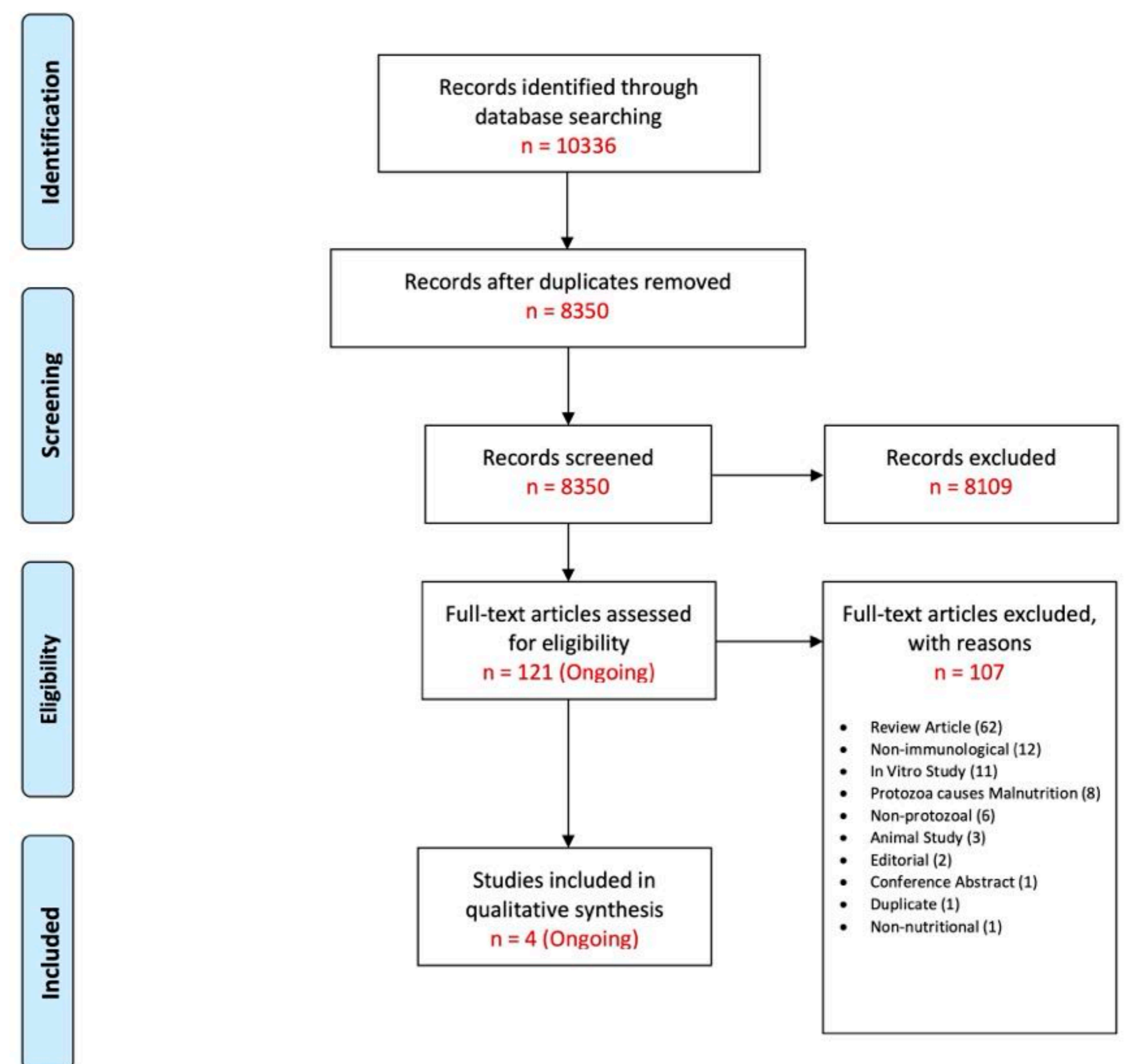


Figure 1. PRISMA Flowchart

Results

Author, Year	Country	Design	Population	Sample Size	Assessment / Intervention	Mean Age ± SD	Sex (F:M)	Outcomes
¹ Junior, 2019	Brazil	Observational Cohort	Overweight adult males with cardiac and indeterminate forms of Chagas Disease	64 Indeterminate (46) Cardiac (18)	Serum vitamin D (via 25(OH)D3), and cathelicidin LL-37	Indeterminate (60) Cardiac (62)	0:46	Patients with the cardiac form had lower levels of serum 25(OH)D3 (p=0.03), however cathelicidin was similar between groups.
² Castilhos, 2017	Brazil	Case-Control	Age, sex, & comorbidity matched Chagas cases and healthy controls	162 Cases (81) Controls (81)	Nutritional status via food frequency questionnaire and diet quality via the BHEI-R	Cases (63 ± 13.5) Controls (66 ± 10.7)	102:60	Chagas group had a lower intake of energy, vitamins A, D, and E, magnesium, and selenium, and a higher intake of lipids consistent with an inflammatory diet (p<0.0001 - p=0.0060). No statistically significant difference in BHEI-R.
³ da Silva, 2017	Brazil	Randomized Control Trial	Patients > 18 years old previously diagnosed with chronic Chagas cardiomyopathy versus healthy controls	40 Intervention (21) Controls (19)	Omega-3 PUFAs at a dose of 3 g/day or a placebo (corn oil) for 8 weeks	Intervention (58.6 ± 11) Controls (55 ± 9.5)	23:19	The omega-3 PUFAs group demonstrated greater improvements in serum triglycerides (-21.1 vs. -4.1; p = 0.05) and IL-10 levels (-10.6 vs. -35.7; p = 0.01)
⁴ Rivera 2002	Brazil	Case-Control	Confirmed positive serology for Chagas disease	170 Cases Rio de Janeiro (122) Belo Horizonte (48) 32 Controls Rio de Janeiro (16) Belo Horizonte (16)	Serum selenium, glutathione peroxidase activity, and thyroid-stimulating hormone concentration, during the progression of chagasic cardiomyopathy	Cases: Rio de Janeiro (49 ± 12) Belo Horizonte (43 ± 10) Controls: Rio de Janeiro (33 ± 8) Belo Horizonte (39 ± 12)	Cases: Rio de Janeiro (65:67) Belo Horizonte (17:31) Controls: Rio de Janeiro (7:9) Belo Horizonte (9:7)	Selenium concentration was significantly lower in chronic disease patients than in healthy adults on all accounts (65 ng/mL versus 72 ng/ mL; P< 0.01).

Table 2. Preliminary Data Extraction of Included Studies

Abbreviations: Brazilian Healthy Eating Index-Revised (BHEI-R), Poly-Unsaturated Fatty Acids (PUFA), Interleukin (IL-10)

Discussion

- Following full-text screening 4 articles remained for inclusion
- Deficiencies reported thus far include vitamin D (n=2), selenium (n=2), vitamin A (n=1), vitamin E (n=1), magnesium (n=1), and omega-3 polyunsaturated fatty acids (n=1), which intersected with host clinical course and Chagas progression variably
- The data collected will be concisely reported to illustrate the findings of published literature regarding the various ways that the function of the immune system in people with Chagas disease alters & deteriorates due to nutrient deficiencies or irregular micronutrient status
- This combined body of information will potentially improve the prognosis of patients with Chagas disease, by informing about possible adjunctive therapies

References

