

Nutritional Status, Dietary Intake, and Nutrition-Related Interventions Among Older Adults With Type 1 Diabetes (T1D): A Systematic Review and Call for More Evidence Toward Clinical Guidelines

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Background

- Growing number of older adults living with T1D as treatments improve and U.S. population ages
- Unique, rapidly changing physiological needs that shape diabetes self-management & health outcomes
- Strategies from earlier decades may no longer be optimal during older adulthood
- Nutrition & diet are foundational to optimizing diabetes care and glycemic outcomes and for promoting overall health and wellness
- Traditional T1D dietary counseling involves carbohydrate counting to accurately dose insulin
- Biopsychosocial changes during older adulthood pose challenges to optimal nutrition, increase risks of complications
- No age-specific nutrition guidelines for older adults w/ T1D

Objective

- Summarize existing evidence surrounding nutritional status, dietary intake, nutrition-related interventions & clinical practice guidelines

Methods

- Used Cochrane guidelines to screen original research (Jan 1993 – 2023) and guidelines (2012 – 2023) in two databases to characterize nutrition evidence pertaining to older adults with T1D
- Age inclusion criteria = at least one of the following: 1) participants mean/median age ≥ 65 years (regardless of SD) or no participants age ≤ 60 years or 2) participants mean age ≥ 60 years if SD included age 65

Results

- Limited original research (n=11), clinical guidelines (n=10), and one scoping review explicitly focused on nutrition in adults ≥ 65 years of age with T1D

Original Research: Experimental (n=6) & Observational (n=5)

- Experimental: RCTs (n=4), single-arm (n=1), crossover trial (n=1)
- Examined effects of **eating strategies** (i.e., low protein vs. usual diet; improved diet quality vs. usual diet; low-fat low protein meal vs. high-fat, high-protein meal; combined glucose-fructose-xylitol vs. glucose total parenteral nutrition; dietitian + endocrinologist follow-up vs. endocrinologist follow-up) on **clinical parameters** (i.e., glomerular filtration rate; carotid intima media thickness; glucose incremental area under the curve; plasma blood glucose & insulin requirements; HbA1c)
- Observational: cross-sectional (n=4), post-hoc RCT analysis (n=1)
- Majority (n=4) sought to characterize behaviors & psychosocial factors related to nutrition
- Evaluated nutrition-related strategies (n=2)
 - Carbohydrate counting accuracy assessment
 - Post-hoc analysis of differences in nutrient intake & pulse wave velocity after a 120-month RCT

Reviews and Meta-Analyses: Scoping Review (n=1)

- Best practice guidelines for the dietary management of diabetes in older adults (2019), review of 11 previously published guidelines
 - Healthy eating, fiber and glycemic index, low fat versus full fat diet, added sugar, weight management
 - Little mention of T1D in older adults
 - Physician- & dietitian-developed guidelines differed from dietitian-developed guidelines slightly

Clinical Consensus and Care Guidelines (n=10)

- Guidance relevant to: older adults w/ diabetes (n=7), diabetes (n=2), older adults w/ T1D (n=1)
- Modified dietary and treatment strategies, glycemic and/or hypoglycemia management, cognitive capacity and/or age-related comorbidities, individualized treatment (n=9)
- Physical activity, insulin, malnutrition, restrictive dieting, and/or weight loss/gain, education/counseling (n=8)
- Screening/assessment tools, specific to those experiencing frailty and/or sarcopenia (n=7), community resources, specific to long term care, specific to hospitalized/receiving end of life care (n=5)
- Apart from T1D specific guidelines, only n=5 included guidance relevant to nutrition in the context of T1D
 - Insulin therapy modifications for various conditions (functional, cognitive impairment) & settings (long term care, end of life care) and methods to improve glycemic control

Discussion

- Sparse data on nutrition and diet in older adults living with T1D
- Few experimental and observational studies explicitly focused on nutrition or diet
- Recent guidelines and consensus papers lack specificity for nutrition-related guidance
- Findings limited by: studies that combine T1D and T2D participants and outcomes, diverse diabetes durations, and age groups
- Highlights urgent need for research to characterize nutritional status, dietary intake, and eating behaviors
 - Needed to inform and develop nutrition-related interventions tailored to this population's needed
- Significant knowledge gaps may impede evidence-based nutrition counseling among older adults with T1D
 - Applicability unclear if recommendations made draw on studies focused on type 2 diabetes/older literature

Challenges for Nutrition Research in Older Adults with Type 1 Diabetes

- Understanding physiological, behavioral, social, and economic age-related changes relevant to nutritional status and dietary intake
 - e.g. nutrient absorption, appetite; dexterity, mobility, and frailty; living situation and available social support; income and food security
- Accurately measuring dietary intake in context of diabetes management
- Balancing nutritional considerations of diabetes alongside those of other co-morbidities

Next Steps for Evidence Generation

- Sampling key subgroups to maximize generalizability
- Characterizing eating behaviors alongside dietary intake
- Identifying main drivers of eating behaviors and nutritional status
- Developing and testing nutrition interventions that consider diabetes management and management of other comorbidities
- Including perspectives of older adults in study development and assessment

Considerations for Clinical Nutrition Guidelines

- Integrating optimal diabetes nutrition with other aspects of health (i.e., comorbidities), aging (i.e., functional status), and wellness (i.e., quality of life)
- Recommending eating behaviors and patterns alongside nutrition targets
- Establishing recommendations for reassessments to account for changes

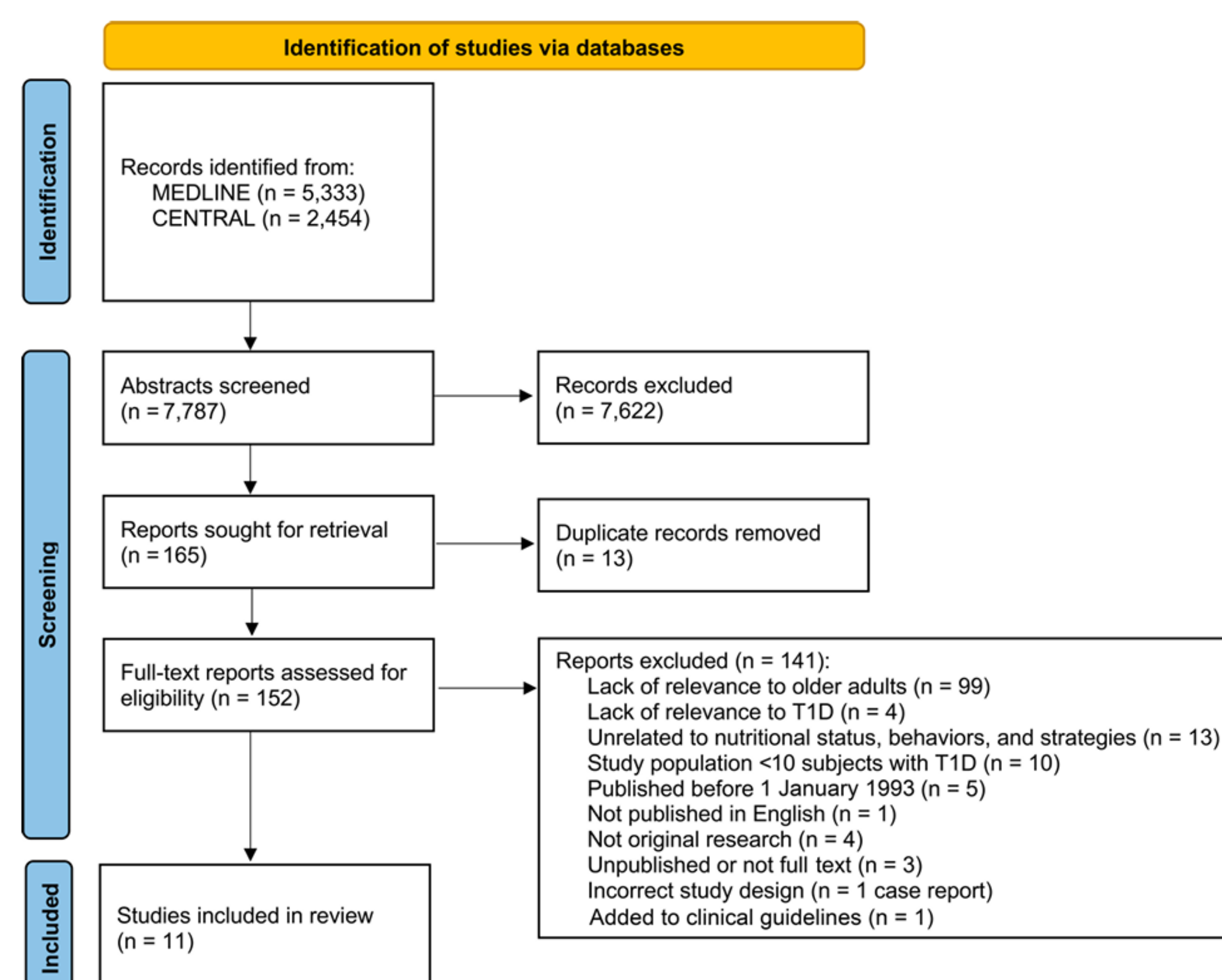


Figure 1—PRISMA diagram.

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