# Establishing the Limitations of Research regarding Obesity among Youth with Disabilities: a Narrative Literature Review

School of Medicine
UNIVERSITY OF COLORADO
ANSCHUTZ MEDICAL CAMPUS

Austin Peralta-Fogle, BS; Jaime Moore, MD

## Abstract

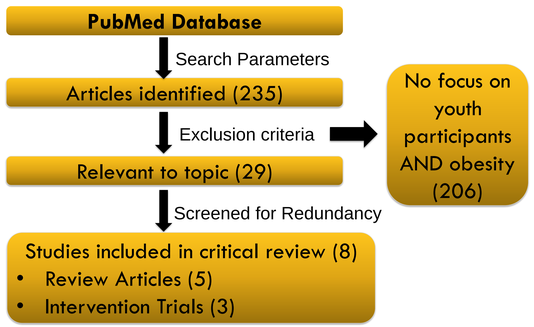
Obesity in children is increasingly prevalent in the United States, with 2x-5x higher rates observed in children with an intellectual or developmental disability. Through a narrative literature review, this study outlines the limitations of interventions for this group. Through examination of included articles, data exist on numerous interventions for this group; however, this data continues to be underpowered, varied by diagnosis, and a lack of practice-based guidelines endures.

## Introduction

- Over 1/3 of children and adolescents in the United States have overweight or obesity.[1] Even higher rates exist among youth with intellectual and developmental disabilities (IDD), as high as 70-86% in groups with syndromic obesity.[2]
- Specific groups with increased risk include: Autism Spectrum Disorder (ASD), Down Syndrome (DS), Prader-Willi Syndrome (PWS), & Bardet-Biedl Syndrome (BBS).
- Risk factors include food selectivity, hyperphagia, psychotropic medication use, increased sedentary behavior, and genetics.
- Our aim is to examine the current literature to better outline these limitations.

## Material and Methods

PubMed database was searched from 2010 to October 2020 for relevant articles. Narrative review was conducted to summarize and evaluate data.




## Results

- Of 28 intervention trials represented in the review articles, 11 (39%) had <10 individuals, 24 (86%) had <100.[3,4,5,6,7]
- Few trials (20%) compared interventions to a control group of children without IDD or syndromic obesity.
- Two of the reviews (Abeysekara et al., Crino et al.) synthesized risk factors and intervention recommendations for their specific demographic in narrative fashion.[3,4]
- Healy et al. used a peer-reviewed quality appraisal tool and found only one clinical trial to be *Strong*.[5]
- Consensus recommendations suggest establishing a family-centered medical home, utilizing multidisciplinary teams (dietitian, psychologist, physician), incorporating technology, and considering bariatric surgery when medical criteria are met.

**Table 1. Select characteristics of review articles**

| | Clinical Diagnoses | Interventions | N Range (total) | Ages (years) | Dates reviewed | Quality Appraisal | Notable qualities |
|---|---|---|---|---|---|---|---|
| **Abeysekara et al. 2014** | CYSHCN | Family-centered care, medical home, PA | NP | NP | 1998-2017 | No | ICF model recommended as guiding framework for disability classification, narrative review |
| **Walker et al., 2018** | IDD, ASD, DS, physical disability | Multi-disciplinary diet/PA program, technology delivered diet program, retrospective review of Brenner FIT program | 21-453 (734) | 2-19 | 2014-2017 | No | Largest aggregate sample across IDD studies. Significant heterogenous sampling. |
| **Crino et al., 2018** | PWS | Behavioral intervention, medications, bariatric surgery | NP | NP | 1983 -2018 | No | Robust PWS pathophysiology, pharmacology, interventions, Narrative review |
| **Healy et al., 2019** | ASD | Nutrition, PA, motivational interviewing, medications | 1-115 (393) | 2-20 | 2011-2017 | Yes | Significant overrepresentation of males in studies reviewed |
| **Matheson et al., 2019** | PWS, BBS, DS, ID/D | Bariatric Surgery | 1-24 (89) | 4-24 | 1980-2019 | No | 80% sample represented by PWS. Minimum age was 4, though majority were >10. |

CHYSHCN – Children/Youth with Special Health Care Needs; PA – physical activity; NP – not presented; **ICF** – International Classification of Functioning

**Table 2. Select characteristics of individual intervention studies**

| | Clinical Diagnoses | Intervention | N | Ages (years) | Outcomes (primary result) | Notable qualities |
|---|---|---|---|---|---|---|
| **Wu et al., 2017** | IDD, DS, ASD | [RCT] 12 weeks; Prescriptive cross-circuit training sessions utilizing bodyweight exercises, balance boards, and treadmill | 43 | 13-19 | Weight loss (-1.640 kg [-4.204 to 0.924, 95% CI] vs control), Muscular endurance, Maximal heart rate, Balance | ICF-CY standardization used; secondary disabilities (DS, ASD) not included in analysis |
| **Rubin et al, 2019** | PWS | [RCT] 24 weeks; Pre-planned, parent-led PA sessions including use of sports equipment, playgrounds, and Nintendo Wii. | 111 (45 PWS) | 8-16 | BMI change (Increase in BMI of control group from baseline to 24 wks [28.49 ± .63 to 28.98 ± .70 kg/m$^2$; $p$ = 0.32] not shown in PWS group) Lean body mass, Duration of physical activity (min/day), Blood pressure, resting HR, QOL measures | No significant outcomes aside from QOL. However, secondary analysis of PA showed improved weight outcomes in those with increased activity. |
| **Liu et al., 2020** | PWS | [Prospective Observational] Bariatric Surgery and multidisciplinary follow-up program | 5 | 15-23 | %Total weight loss (24.7% at 2 years; 11.9% at 5 years; 0% at 10 years), Comorbidity resolution | 10-year observational study post-bariatric surgery |

QOL – quality of life; ICF-CY – International Classification of Functioning, Disability and Health for Children and Youth Framework

## Conclusion

- Multiple contemporary reviews exist on weight management in youth with IDD.
- Despite this, sample sizes are limited. The low incidence of certain IDD etiologies (i.e. genetic syndromes) directly impacts this.
- IDD is highly heterogeneous. Studies often do not differentiate by participant diagnosis, which may impair the development of tailored weight management interventions.
- A consensus among authors was that positive outcomes were consistently observed in the setting of comprehensive, multidisciplinary team interventions.
- Well-powered, controlled intervention trials are needed to inform future guidelines.

## Limitations of this Project

- This literature review only spanned one database.
- The reviews reported on covered numerous topics within a heterogenous group, limiting specificity and external validity of conclusions.
- No quantitative analysis was conducted of the three unique intervention trials.

## Conflicts of Interest & Funding

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