# Use of mid-upper arm circumference (MUAC) measurement among children with disabilities: A systematic review

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## Background

- Children with disabilities are at increased risk of malnutrition due to many reasons directly and indirectly related to underlying impairments or their environments.
- Children with disabilities are often neglected in malnutrition guidelines, and it remains unclear which measures of nutritional status are appropriate for tracking and monitoring children's growth. [1,2] This is an important gap since both disability and malnutrition are major global public health issues.
- Mid-upper arm circumference (MUAC) is an imperfect measure of nutritional status with both advantages and disadvantages. [3-5]

## Methods

- Following PRISMA guidelines, we conducted a systematic review of existing published peer-reviewed research on the use of MUAC among children with disabilities (Figure 1). [6]
- Inclusion criteria: Peer-reviewed research, published in English between 1990-2021, which included children ages 6 months to 18 years with disabilities and MUAC measurements.
- Data extraction included: study design, location, population, age range, sex representation, disability type and setting, methods for MUAC measurement, variations in terminology, measurement references or measurement techniques. Z-scores and percentiles for MUAC and other forms of anthropometry were included where available.
- The JBI Critical Appraisal Tool for appraisal of cross-sectional studies, cohort studies, case-control studies and randomized control trials was used to assess the papers. [7]

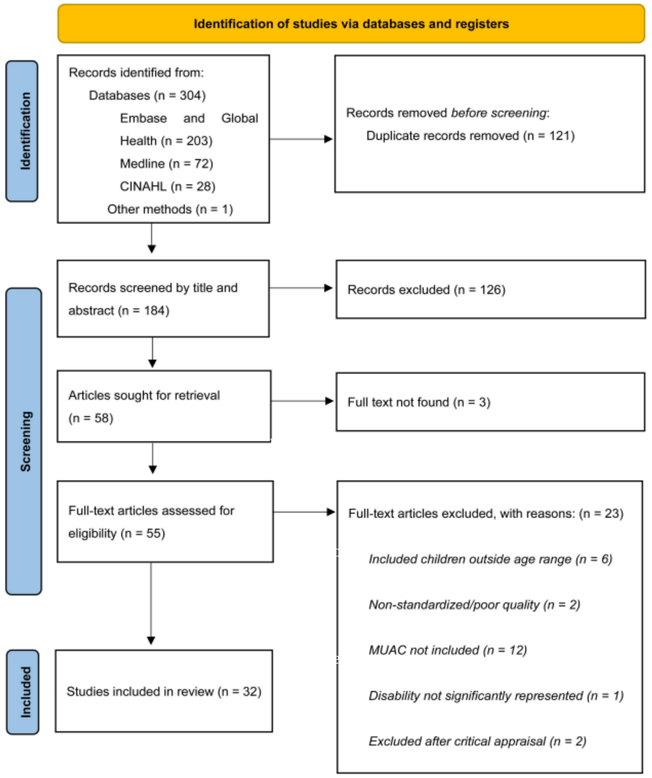


**Figure 1**. Prisma Flow Chart

## Results

- A total of 32 studies were included for final analysis.
- Over half of the studies (17/32, 53%) were published in the past five years (2017 through 2022).
- Most were observational studies (29/32, 91%), representing 26 different countries.
- Commonest forms of disability reported were cerebral palsy, intellectual impairment, visual impairment and autism spectrum disorder.
- Nine studies (29%) included more than one type of disability.
- Terminology and methods for obtaining MUAC measurements varied.
- Reporting of MUAC also varied among studies. Of the studies that included measurements for both MUAC and weight-for-height only eight reported both with the same method.
- Standardized references have evolved through this period and therefore variation in references used for anthropometric measurements is notable (Figure 2).

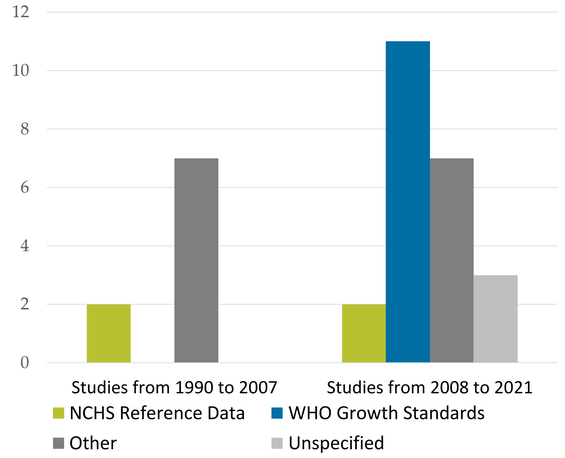


**Figure 2**. Reference data used for MUAC measurements

## Conclusions

- A key finding was the limited amount of interpretable data or standardization of use of MUAC for children with disabilities.
- Without validated measures to identify malnutrition and monitor the growth of these children, millions could have severe but avoidable consequences to their health and development.
- Further research should examine the use of MUAC as an important measurement of nutritional status for those children with disabilities, as part of a multimodal nutrition assessment, especially when other anthropometric measurements may not be appropriate based on clinical sequelae.

## References

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