

Nutrition and Feeding Challenges in Intellectual and Developmental Disabilities: A Narrative Review

Priyadharsni, P.^{1*}, Akilandeswari, S.¹, Vanithamani, P.¹, Sakthivel, S.², Sabarish, C.², and Akshay, S.²

¹Department of Physical Education, Avinashilingam Institute for Home Science and Higher Education for Women, India.

²Faculty of General & Adapted Physical Education and Yoga, Ramakrishna Mission Vivekananda Educational and Research Institute, India.

*Corresponding author: 22phpef001@avinuty.ac.in Phone number: +918220521761

ABSTRACT

Background: The nutritional health issues of people with intellectual and developmental disabilities (IDD) are especially challenging because there are biological, behavioural, environmental, and social factors that make them vulnerable. The difficulty of feeding, food selectivity, poor dietary quality, micronutrient deficiencies, and low uptake of nutrition services can negatively impact health, functional ability and quality of life.

Objective: The purpose of this narrative review was to consolidate the existing evidence on nutrition and feeding difficulties among people with IDD and to identify strategies that could positively impact nutrition and well-being.

Methodology: Evidence from major electronic databases, such as PubMed, Scopus, Web of Science, ScienceDirect, and Google Scholar, was identified through a narrative review of the literature. Literature from 2004 to January 2026 was reviewed, with key areas of nutritional status, micronutrient deficiencies, dietary patterns, food selectivity, feeding difficulties, caregiver influences, and nutrition-related interventions in individuals with IDD identified for review.

Results: Evidence shows that the nutritional vulnerability of people with IDD is considerable, from undernutrition to overnutrition. Common barriers are: poor nutrient intake, sensory sensitivities and food selectivity, feeding and swallowing disorders, oral-motor difficulties, and caregiver barriers. Other factors that contribute to nutritional gaps include social and environmental factors, such as limited access to healthcare and food insecurity. Multidisciplinary nutritional care, individualised dietary management, feeding support, caregiver education, and lifestyle-based interventions were found to be key strategies for obtaining better nutritional outcomes.

Conclusion: Feeding and nutrition issues are important problems persisting for people with IDD. Person-centred, comprehensive, multidisciplinary approaches are needed to help maintain optimal nutritional status, health, and quality of life.

Keywords: Caregiver Support, Feeding Difficulties, Intellectual and Developmental Disabilities, Nutrition and Nutritional Status

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INTRODUCTION

Intellectual and developmental disabilities (IDD) are a diverse group of lifelong neurodevelopmental disorders that have a significant impact on in-

tellectual function, adaptive behaviour, communication, and social participation and occur during the developmental period (1). IDD is a wide range of disorders, such as intellectual disability (ID), autism spectrum disorders (ASD), Down syndrome,

cerebral palsy and other developmental disorders that impact cognitive, behavioural, and functional skills (2,3). With advances in healthcare, including early diagnosis and supportive services, the IDD population has increased, and a comprehensive health and nutrition care plan is needed throughout the lifespan (4). However, persons with IDD still suffer from great health and nutrition inequality, such as a lack of suitable health and nutrition services, which leads to poor health (1,4).

Nutrition status is a major factor in both physical growth and cognitive, immune, metabolic and overall health. People with IDD require adequate nutrition because poor nutrition can worsen developmental delays, make someone more vulnerable to chronic diseases, and impact their functional independence (1). There has been growing evidence that people with IDD have poor diet quality, malnutrition, and vitamin and mineral deficiencies, which are likely caused by the interplay of biological, behavioural and environmental factors (2,5). Studies also have found that individuals with IDD are more likely to eat less of the foods they need and more of the foods they don't, including energy- and highly processed foods, which can increase risk of chronic disease and ill health from childhood to adulthood (6,7).

Nutritional care is therefore an increasingly relevant component of the multidisciplinary approach to this population. However, the nutritional vulnerability of individuals with IDD is poly etiologic and not only depends on the person's food intake. Other factors affecting the eating behaviours and food intake of many individuals limit nutrient adequacy, including feeding and swallowing difficulties, oral-motor impairments, chewing problems, gastrointestinal disorders, and sensory-related eating behaviours (8,9). Limited food consumption or restricted eating patterns are associated with less consumption of a variety of foods and a higher risk for nutrient deficiencies in individuals with ASD and other developmental disabilities (10,11). Additionally, the reliance on the caregiver to provide food, prepare and feed the child can be serious and may vary based on the caregiver's knowledge, socioeconomic status and access to support services (12,13). This population is also especially vulnerable to malnutrition due to food insecurity, limited access to healthcare, and other environmental challenges, such as limited nutrition services (4).

Although there has been growing interest in nutrition-related issues in IDD over the past few years, the literature is widely dispersed across fields such as nutrition, rehabilitation, developmental medicine, occupational therapy, psychology, and public health. Studies to date have concentrated on individual components of nutrition-related health issues, such as feeding disorders, food selectivity, food quality, obesity, micronutrient deficiencies and caregiver experiences (14,15), but there has been little research that integrates these individual components into a holistic study. Thus, a comprehensive review that brings together the existing evidence on the wide spectrum of nutrition and feeding problems of persons with IDD is needed. This is particularly true in the context of longstanding health inequalities, nutritional requirements and the lack of disability-specific nutrition services in many health care systems (16,17).

The purpose of this narrative review is thus to give a comprehensive overview of nutrition and feeding problems in the IDD population. In particular, this review focuses on nutritional vulnerabilities, dietary behaviours, food selectivity, feeding and oral-motor difficulties and factors that impact nutritional status through the lifespan. In addition, the review analyses the roles of caregivers and environmental factors, as well as existing interventions that may improve nutritional outcomes and well-being. This review is intended to provide information that can be helpful in clinical practice and research priorities, and to support the development of a multidisciplinary approach to the multifaceted nutritional problems of persons with IDD. The multifactorial nature of nutrition and feeding problems of persons with IDD is conceptualised in Figure 1, which is based on a literature review.

Several factors contribute to the nutritional issues of people living with IDD, and they are the result of the interaction between biological, behavioural, caregiver and environmental factors. All of these factors have modulatory effects on feeding behaviours, nutrient intake, nutritional status and health outcomes. There is a need for multi-disciplinary, family-centred nutrition interventions at both the individual and system level to improve nutritional well-being.

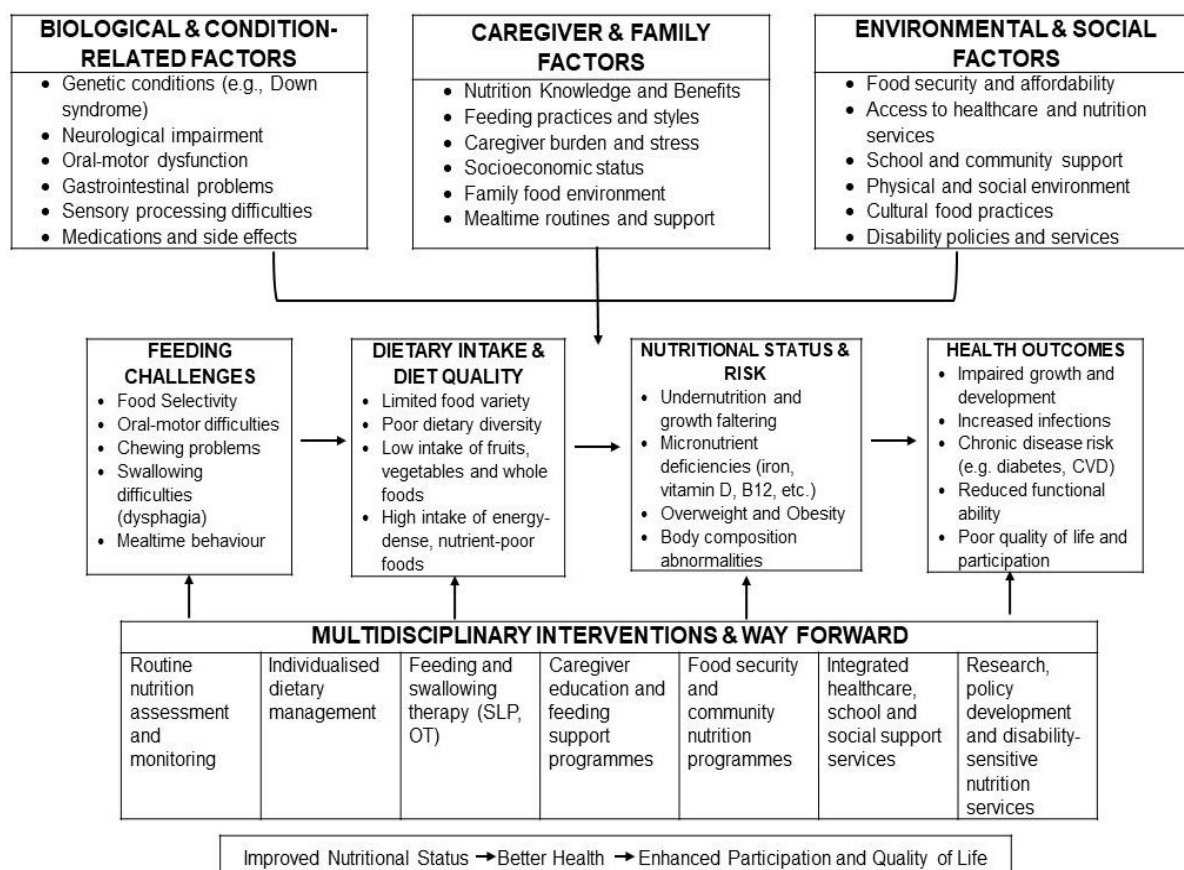


Figure 1: Conceptual Framework of Nutrition and Feeding Challenges in People with IDD

Note: SLP – Speech-Language Pathologist, OT – Occupational Therapist, CVD – cardiovascular disease

METHODS

Literature Search Strategy

This narrative literature review was performed to synthesise literature on nutrition and feeding issues in people with IDD. A Scale for the Assessment of Narrative Review Articles (SANRA) was used to prepare the review. Narrative reviews are also valuable for summarising evidence from multiple study designs and disciplinary perspectives to understand the broader picture of a complex health issue and to identify opportunities for new research and/or practice (18,19).

Searches were performed in electronic databases PubMed (approximately 238 records), Scopus, Web of Science, Google Scholar, and ScienceDirect before selecting records for inclusion in this review. The databases were selected for maximum breadth of biomedical, nutritional, rehabilitation, public health, and disability-related information. The studies searched were published from 2004 to January 2026 and conducted between June 2025 and January 2026 to ensure that existing and recent studies relevant to nutritional health issues in individuals with IDD were included.

Search terms were created based on the goals of the review and consisted of combinations of keywords and/or Medical Subject Headings (MeSH) when applicable, with Boolean operators (AND/OR). Articles published in the English language were included under the following key search terms: "intellectual disability," "developmental disability," "autism spectrum disorder," "nutrition," "nutritional status," "malnutrition," "micronutrient deficiency," "diet quality," "feeding difficulties," "food selectivity," "oral-motor dysfunction," "dysphagia," "caregiver support," "dietary behaviour" and "nutrition intervention" studies. The additional studies were identified through manual screening of reference lists from relevant reviews and key publications.

Study Selection and Eligibility

Studies were chosen because they are pertinent to the review's goal. Qualitative, observational, intervention, policy, systematic, scoping, and narrative reviews, as well as articles reporting original research on nutrition and health outcomes in people with IDD, were included. Special focus was given to research on the nutritional status, malnutrition, micronutrient deficiencies, dietary behaviours,

food selectivity, feeding and swallowing impairments, caregiver influences, environmental factors, and nutrition-related interventions of individuals with IDD.

Publications were discarded if they did not discuss people with intellectual and/or developmental disabilities, nutrition and/or feeding outcomes, or if there was not enough information in the publication to be of benefit to the objectives of this review. The abstracts of the conference, editorials, commentaries, and non-peer-reviewed publications were usually not included unless they provided important background information. As the review was narrative in nature, studies did not need to be methodologically designed, and a variety of evidence types were included to help understand the complex nutritional challenge faced by people with IDD.

Scope of the Review

This review paper sought to integrate and critically analyse the existing research on nutrition and feeding difficulties throughout the lifespan of people with IDD. It highlights a number of interconnected topics: nutritional vulnerability, malnutrition, micronutrient deficiencies, dietary behaviours, food selectivity, feeding and oral-motor issues, caregiver and environmental influences, and nutrition intervention strategies. Moreover, the review explores broader lifestyle strategies that could contribute to nutritional and overall health in people with IDD.

The purpose of this review is to provide evidence from nutrition science, developmental medicine, rehabilitation, occupational therapy, psychology, public health, and disability research to give clinicians, researchers, caregivers, and policymakers a comprehensive picture of what is known. In addition, it aims to identify gaps in the literature and priorities for policy and multidisciplinary practice to enhance the nutritional outcomes and quality of life of people with IDD.

Tables 1a to c present an integrated evidence map of the main nutrition and feeding domains relevant to people with IDD, prepared to facilitate a critical synthesis of the reviewed literature. The table collates the general direction and consistency of evidence, dominant study design, geographical representation, strength of evidence, and main gaps

identified in the literature based on individual studies rather than summarising them. This method will give an overview of the existing body of evidence and identify gaps for future research.

As indicated in Table 1, all of the available evidence indicates that nutrition and feeding problems in people with IDD are multifactorial and interconnected. There is strong evidence for high prevalence of malnutrition, food selectivity and feeding difficulties, and moderate evidence for the roles of caregiver, environmental, and healthcare factors in nutritional outcomes. While it is encouraging to see the nutrition intervention being multidisciplinary, the available evidence base is skewed towards observations in high-income countries, and the causal inference and global generalisability of these remains unknown. The results highlight the need for standardised nutritional assessment approaches, longer-term studies, and high-quality intervention studies to enhance evidence-based nutrition care for people with IDD.

Nutritional Vulnerability in Individuals with IDD

Nutritional problems are disproportionately high in the IDD population compared to the general population. The biological, behavioural, functional, and environmental factors that affect dietary intake, nutritional status, and health outcomes contribute to nutritional vulnerability in this population (1). Many persons with IDD have difficulties with eating, swallowing, and/or gastrointestinal issues, limited mobility, side effects of medication, and may require assistance from others for food selection and preparation, which can all affect nutritional status (2,4).

Food and nutrition intake in people with IDD can be undernutrition or overnutrition, based on the reviews (2) and observational studies that take into account feeding challenges, limited mobility, medication use, and nutrition services that are not accessible (1,5). The findings emphasise the importance of conducting a detailed nutritional assessment, providing targeted nutritional support to identify nutrient deficiencies and/or excess energy intake, and considering the broader social and health landscape that influences nutritional status.

Table 1a: Synthesised Evidence Map of Nutritional Status and Dietary Patterns in People with IDD

Evidence domain	Synthesised evidence	Consistency and strength of evidence	Predominantly evidence-base	Geographical distribution	Key knowledge gaps and future research needs
Nutritional status and malnutrition	The evidence consistently demonstrates that individuals with IDD experience a dual burden of malnutrition, including undernutrition, overweight, obesity, and poor dietary quality. Nutritional outcomes vary according to disability severity, age, functional dependence, comorbidities, medication use, and living environment. Across studies, inadequate dietary intake and reduced diet quality contribute to poorer health outcomes, while obesity is increasingly recognised as a significant concern, particularly among adolescents and adults.	Strong and consistent. Findings are highly concordant across systematic reviews and observational studies despite differences in study populations and assessment methods.	Systematic reviews, narrative reviews, cross-sectional and observational studies.	Evidence is predominantly derived from high-income countries, including Europe, North America, Australia, Japan and Saudi Arabia, with comparatively limited evidence from LMICs.	Longitudinal cohort studies are needed to clarify nutritional trajectories across the lifespan. Standardised nutritional assessment tools and greater representation of LMIC populations are required to improve global applicability.
Micronutrient deficiencies	Evidence consistently identifies vitamin D and calcium deficiencies as the most frequently reported micronutrient inadequacies among individuals with IDD. Several studies also report inadequate intakes of iron, zinc, folate, vitamin B12, vitamin A and iodine, largely associated with selective eating, restricted dietary diversity, feeding difficulties and medication-related effects. Although micronutrient deficiencies are widely recognised, intervention studies evaluating supplementation and long-term correction remain scarce.	Moderate to strong. Consistent findings are reported across observational studies, although evidence for several micronutrients is less extensive than for vitamin D and calcium.	Nutritional assessments, cross-sectional studies, systematic reviews and clinical observational studies.	Most evidence originates from Europe, Japan, Malaysia, Saudi Arabia and Australia, with relatively limited data from developing countries.	Randomised intervention studies evaluating micronutrient supplementation, optimal screening protocols and long-term clinical outcomes are required.
Food selectivity and dietary behaviours	Strong evidence indicates that food selectivity represents one of the most important contributors to poor nutritional intake among individuals with IDD, particularly those with ASD. Sensory hypersensitivity, behavioural rigidity, food neophobia, a limited food repertoire and preference for energy-dense foods consistently contribute to reduced dietary diversity and inadequate nutrient intake. These behaviours are associated with both micronutrient deficiencies and obesity, depending on dietary patterns.	Strong and highly consistent. Findings are replicated across systematic reviews and observational research involving children and adolescents.	Systematic reviews, behavioural research, cross-sectional and observational studies.	Research is concentrated primarily in high-income countries, particularly the United States, Europe and Australia.	Standardised definitions of food selectivity, culturally diverse populations and greater inclusion of adults remain important research priorities.

Meanwhile, obesity has become a growing problem for individuals with IDD. Excessive weight gain and metabolic complications can be caused by poor diet quality, sedentary lifestyle and limited physical activity opportunities, as well as long-term medication use (2). There is therefore a potential for “double burden” malnutrition within the same population of individuals with IDD, with undernutrition, micronutrient deficiencies, overweight and obesity all occurring at the same time. This double burden underscores the importance of a holistic nutrition assessment and tailored nutrition interventions to address undernutrition and overnutrition simultaneously.

In recent publications, the various social determinants of nutritional vulnerability have been emphasised.

People with ID remain vulnerable and neglected, and inequalities in nutritional care and health promotion services still exist (16). A recent scoping review concluded that factors influencing the nutritional status of adolescents with ID include caregiver support, dietary patterns, physical activity levels, socioeconomic factors and environmental factors. Factors associated with disability do not fully explain nutritional outcomes; multiple factors must be considered, underscoring the need for a holistic and multidisciplinary approach (20).

The evidence reviewed suggests that nutrition vulnerability and disability are not directly linked. Rather, it is a product of a combination of health, feeding issues, caregiver resources, and social factors. This underscores the importance of nutrition care that is not merely the assessment of diet but

encompasses more. Combined individualised and multi-disciplinary care is more likely to result in better nutrition outcomes than dietary interventions alone. In summary, the current evidence suggests that nutritional vulnerability is a complex phenomenon among people with IDD, and can be attributed to the interplay of biological, behavioural, functional, caregiver, and environmental-related

factors. Evidence of undernutrition and overnutrition is consistently reported, with the bulk of evidence coming from high-income countries. Thus, future research on nutrition trajectories and effective interventions across various health care settings requires longitudinal, context-specific nutrition studies.

Table 1b: Synthesised Evidence Map of Feeding Practices and Environmental Influences in People with IDD

Evidence domain	Synthesised evidence	Consistency and strength of evidence	Predominantly evidence-base	Geographical distribution	Key knowledge gaps and future research needs
Feeding difficulties and oral-motor dysfunction	Evidence consistently demonstrates that dysphagia, impaired chewing, oral-motor dysfunction, swallowing difficulties and prolonged mealtimes adversely affect nutritional intake and increase the risk of malnutrition, aspiration and reduced quality of life. Feeding difficulties frequently coexist with neurological impairments and require a multidisciplinary assessment involving speech-language therapists, dietitians and other healthcare professionals.	Moderate to strong. Consistent findings are reported, although evidence is based predominantly on observational clinical research.	Clinical observational studies, multi-disciplinary reports and systematic reviews.	Evidence is mainly reported from Europe, Türkiye, Australia and North America.	Future studies should develop validated screening tools, evaluate the effectiveness of multidisciplinary intervention and investigate long-term nutritional outcomes following feeding rehabilitation.
Caregiver, family and environmental influences	The review consistently indicates that caregiver knowledge, family food practices, socioeconomic conditions, institutional living arrangements, healthcare accessibility and community resources substantially influence dietary intake and nutritional outcomes among individuals with IDD. Family-centred nutritional education and caregiver involvement are repeatedly associated with improved dietary management, while limited resources and inadequate professional support contribute to persistent nutritional challenges.	Moderate. Evidence is generally consistent but derives from heterogeneous qualitative, mixed-methods and observational studies.	Qualitative studies, mixed-methods research, observational studies and public health investigations.	Studies originate from India, African countries, Europe and North America, although evidence remains uneven across regions.	Implementation research evaluating caregiver education programmes, culturally adapted nutrition interventions and health-system integration is required, particularly within resource-limited settings.

Micronutrient Deficiencies and Nutritional Status

One of the frequent nutrition issues in people with IDD is micronutrient deficiencies. It has been observed that all types of disabilities are associated with vitamin D and calcium deficiency, impaired growth, poor bone health, reduced immunity, and diminished quality of life (21,22). Meeting nutritional needs with sufficient supplies of micronutrients can be a major challenge, particularly where individuals with IDD might have limited intake of food variety and feeding challenges.

Several studies have reported inadequate micronutrient intake (vitamin D, calcium, and iron) among individuals with IDD, which has been found to negatively impact bone health, immune function, growth, and overall health (6,21,22). What appears to be connected to lack of food variety, feeding problems, restricted movement, and limited opportunities to get out and enjoy outdoor activities

are these inadequacies. There is evidence for other micronutrient deficiencies besides vitamin D and calcium; these deficiencies are not necessarily well appreciated in clinical practice. Nutritional screening and early nutrition intervention in this population might thus be important for preventing adverse health outcomes later in life.

The risk of vitamin D deficiency is thought to be particularly high due to decreased sun exposure, reduced outdoor recreation, limited mobility, and low dietary intake. Furthermore, there is a risk of osteomalacia and bone complications due to low calcium levels, and bone health status is poor in young adults with ID (21). Several feeding patterns have also been associated with iron deficiency and anaemia, as well as digestive disorders and poor dietary diversity, which can reduce nutrient bioavailability. Deficiencies of zinc and vitamin A have also been reported in people with IDD, and these deficiencies may also lead to reduced immune

functioning, growth delay, poorer cognitive function, and poorer health outcomes (23).

Micronutrient deficiencies have implications for health beyond the physical. Poor dietary intake of vitamins and minerals can impair cognitive function, the immune system, metabolic control, and overall well-being. Therefore, it is suggested that nutritional screening, individualised nutritional care plans, and nutritional supplementation methods are important components of comprehensive care plans for persons with IDD (3).

Vitamin D and calcium deficiencies are consistently reported in the literature, whereas evidence for a few other micronutrients is limited. This indicates that the nutritional difficulties faced by persons with

IDD could be more widespread than is currently understood. Therefore, it is important to screen, monitor, and manage nutrition as soon as possible to avoid unnecessary health issues and promote good health. Further study is required to understand the prevalence and clinical significance of less-studied micronutrient deficiencies. Taken together, the reviewed studies show that micronutrient deficiencies exist among people with IDD; however, this prevalence varies due to differences in study populations, dietary assessment approaches, and biochemical evaluations. Moreover, there are still limited data on the long-term benefits of micronutrient supplementation, which call for well-designed intervention studies, especially in low- and middle-income countries.

Table 1c: Synthesised Evidence Map of Nutrition Management and Interventions, Overall Evidence Quality, and Research Priorities in People with IDD

Evidence domain	Synthesised evidence	Consistency and strength of evidence	Predominantly evidence-base	Geographical distribution	Key knowledge gaps and future research needs
Nutrition Management and Interventions					
Nutrition interventions and multi-disciplinary management	Available evidence supports comprehensive, individualised nutritional management that incorporates dietary assessment, behavioural modification, caregiver education, oral-motor rehabilitation and regular nutritional monitoring. Multidisciplinary interventions involving dietitians, physicians, psychologists and speech-language therapists demonstrate potential benefits in improving nutritional status and feeding outcomes; however, variation in intervention design and outcome measures limits direct comparison across studies.	Moderate. Positive findings are consistently reported, although overall evidence is constrained by methodological heterogeneity and limited long-term follow-up.	Intervention studies, systematic reviews, clinical practice recommendations and multidisciplinary programmes.	Most intervention evidence has been generated in high-income healthcare settings.	Well-designed multicentre randomised controlled trials, cost-effectiveness analyses and long-term implementation studies are required before definitive recommendations can be established.
Overall evidence quality and research priorities					
Overall quality of evidence and research priorities	Collectively, the reviewed literature consistently supports the importance of early nutritional assessment, multidisciplinary care and regular monitoring in improving health outcomes among individuals with IDD. Nevertheless, the evidence base remains dominated by cross-sectional and observational studies conducted in high-income countries, resulting in limited causal inference and reduced generalisability to diverse healthcare settings. Although the overall direction of evidence is highly consistent, methodological variability and inconsistent outcome measures continue to limit the synthesis of evidence.	Overall moderate to strong. Confidence is strengthened by agreement across multiple systematic reviews and observational studies, but limited by the scarcity of longitudinal and experimental research.	Predominantly systematic reviews and observational literature.	The bulk of published evidence originates from high-income countries, with substantial under-representation of low- and middle-income regions.	Future research should prioritise longitudinal cohort studies, standardised nutritional assessment frameworks, harmonised outcome measures, culturally representative populations and robust intervention trials to strengthen the evidence base for clinical practice and policy development.

Dietary Behaviours and Food Selectivity

Nutrition outcomes of people with IDD are largely influenced by dietary behaviours. Poor dietary quality has been shown in multiple studies of children and adults with IDD, in which the consumption of nutrient-dense foods such as fruits, vegetables, whole grains, and other nutrient-rich foods was low, while energy-dense processed foods were high (6,7). Sensory sensitivities to foods, including texture, taste, smell, temperature, or appearance, may significantly limit the variety of foods consumed by individuals with ASD and other developmental disabilities (10,11). Limited feeding habits can lead to deficiencies in essential vitamins, minerals, fibre, and essential fatty acids, posing a health risk and adding to caregivers' stress during mealtimes. The evidence indicates that food selectivity is not just a dietary problem but also a sensory/behavioural one that may need multi-disciplinary management.

If food selectivity is prevalent, it can significantly reduce intake of nutrient-dense foods and lead to inadequate intake of vitamins, minerals, dietary fibre and essential fatty acids. If eating habits become severely restricted, growth and nutritional status may be affected. Additionally, fussy eating, rigid eating patterns and food refusal behaviours may add to the stress experienced by both the person with IDD and their carer during mealtimes. New research indicates that feeding provision for children with food selectivity may be effective when assisted by a caregiver. Structured feeding approaches within the context of daily routines can help to minimise selective eating and promote good nutritional intake (24). As food selectivity is a multifactorial phenomenon, a team of dietitians, occupational therapists, speech-language pathologists, psychologists and caregivers must work together to effectively address the issue. Interventions to promote food or activity acceptance, sensory tolerance and dietary diversity can improve nutritional outcomes and quality of life in persons with IDD. The evidence is strongly consistent that food selectivity and poor dietary quality are important factors in the nutritional risk of persons with IDD. However, there is a complex interplay between sensory processing, behaviour, caregiver practices, and the environment. Future intervention studies should test sustainable interventions that increase dietary variety and are feasible for families and caregivers.

Feeding and Oral-Motor Challenges

Between 50-75% of people with IDD have feeding and oral-motor issues that are a major challenge for ensuring adequate nutrition. Some of these

challenges are associated with impaired chewing and swallowing (dysphagia), inadequate oral-motor skills, delayed feeding skills, food refusal, and reliance on assistance while eating (15,25). Feeding difficulties are often more or less severe depending on the nature and level of the disability. Feeding and mealtime behaviour problems must be assessed as these are common issues for people with ID who may refuse food, cause disruption to meals, have selective eating, and require support from others. Identifying these behaviours at an early age can help prevent adverse nutritional outcomes and ensure timely intervention (26).

Oral-motor and feeding issues are frequently present in individuals with IDD and can greatly impact nutritional intake, hydration, and quality of life. Recent findings suggest that chewing difficulties, poor oral health, dysphagia, and impaired oral-motor skills may limit one's capacity to eat a diverse diet and lead to aspiration and malnutrition (8,9,27). These challenges can be multifaceted, and working with dietitians, speech-language pathologists, occupational therapists, dentists and physicians is usually necessary for successful management. Timely diagnosis and targeted interventions can help reduce feeding hazards and ensure sufficient nutrition.

Oral-motor and feeding difficulties can have significant implications that extend beyond feeding issues and affect nutrition, health and quality of life. These difficulties are highlighted by the evidence, and it is crucial to identify them as early as possible so that appropriate support is in place before problems manifest. Therefore, a team of dietitians, speech-language pathologists, occupational therapists, dentists and physicians should work together to ensure safe feeding practices and proper nutrition. Feeding and swallowing impairments are repeatedly identified from the evidence as key factors in undermined nutritional status and poorer quality of life. There is a great deal of diversity in the ways assessments are conducted and interventions developed, however, which makes it difficult to compare with other studies. There is a need for more consistency in the use of assessment tools and in multidisciplinary clinical research to support best practice.

Social, Environmental, and Caregiver Determinants of Nutritional Health

Nutritional health of individuals with IDD is influenced by a variety of social, environmental, and caregiver factors. Food purchasing, preparation, and feeding are often provided by family members or support staff; the knowledge and resources

available to the caregiver are important factors in dietary behaviours and nutritional outcomes (13).

Feeding difficulties, food selectivity, behavioural problems and food preferences can significantly increase the caregiver's burden at mealtimes. There is evidence that knowledge of nutrition, the provision of nutrition health care, and caregiver support are not optimal, which may negatively affect the management of nutrition (13). Similar problems are encountered in Africa. A qualitative literature review identified that the caregivers of children with ID often suffer from high emotional, financial, and practical costs, a lack of community support, stigma, and limited access to specialised health and rehabilitation services. These can negatively impact feeding practices, caregivers' capacity, and the provision of nutrition care, underscoring the need for improved family-focused and disability-inclusive support in low-resource environments (28).

Alongside the influences of caregivers, there are social and structural effects that impact the nutrition of people with IDD. Financial difficulties, food insecurity, transportation issues, and poor access to disability-inclusive healthcare and nutrition services can impede appropriate nutrition assessment and intervention (4,12,29). Similar barriers have been reported across the LMICs in sub-Saharan Africa, where a lack of specialised services, socio-

economic factors, and rehabilitation infrastructure limit access to appropriate health services for children with disabilities (30).

Although there is a preponderance of observational evidence, the overall consistency of results across studies in different settings points to the need for a more comprehensive and systematic effort to enhance nutritional outcomes than can be achieved by delivering individual nutrition counselling. Greater focus on improving education for caregivers, an increased presence of community-based nutrition services and the development of disability-inclusive health policies are likely to lead to more sustainable improvements in the nutritional health of people living with IDD. In general, there is evidence that caregiver capacity, socioeconomic status, healthcare services and environmental support affect nutritional status. While these determinants are increasingly recognised, there is a dearth of evidence on interventions to address social and structural barriers, especially in African and other low-resource contexts, and more research is needed at the local level to inform appropriate policies and interventions.

The main nutrition and feeding-related issues identified in the literature reviewed are summarised in Table 2 along with the factors that contribute to these issues, the likely outcomes, and supporting evidence.

Table 2: Major Nutrition and Feeding Problems in People with IDD

Nutrition-Related Challenge	Contributing factors	Potential consequences
Nutritional vulnerability	Disability-related limitations, healthcare disparities, and caregiver dependence	Poor health outcomes and reduced quality of life (1,4,16,20)
Malnutrition	Inadequate dietary intake, poor diet quality, feeding difficulties, sedentary behaviour, medication effects, and socioeconomic barriers	Growth impairment, compromised immunity, metabolic disorders, and increased chronic disease risk (2,5,7)
Micronutrient deficiencies	Restricted dietary intake, poor diet quality, feeding problems	Bone disorders, anaemia, impaired immune function (3,21,22,23)
Poor diet quality	Low fruit and vegetable intake, high consumption of processed foods	Increased cardiometabolic risk (6,7)
Food selectivity	Sensory sensitivities, behavioural rigidity, ASD-related characteristics	Nutrient inadequacies and limited dietary diversity (10,11,24)
Feeding and oral-motor difficulties	Dysphagia, chewing impairment, oral health problems	Aspiration risk, malnutrition, reduced food intake (8,9,26,27)
Caregiver-related challenges	Limited nutrition knowledge, feeding stress, resource constraints	Suboptimal feeding practices and dietary outcomes (12,13)
Environmental and social barriers	Food insecurity, limited healthcare access, socioeconomic disadvantage	Persistent nutritional inequalities (4,12,29)

People with IDD are vulnerable to nutrition issues due to multiple biological, behavioural, caregiver and environmental factors (Table 2), not one single factor. The interrelated problems underscore the importance of integrated and multi-disciplinary assessment, prevention and management.

Nutritional Interventions and Management Strategies

A multidisciplinary approach is required to meet the nutritional needs of IDD consumers, given the interactions among feeding skills, feeding practices, health status, caregiver involvement, and environmental factors affecting feeding. As there is a great variety within the IDD population, nutritional interventions should be personalised to each person's functional capacity, health status, and nutritional needs (1).

A comprehensive nutritional assessment is based on nutrition management. Malnutrition, micronutrient deficiencies, growth problems, obesity, feeding problems, and swallowing problems are monitored regularly, and if someone is identified as at risk, nutritional assistance can be provided at an earlier stage (2). The comprehensive evaluation should include a dietary assessment, anthropometric assessments, biochemical assessments (where applicable), feeding skill assessments, an assessment of oral health, and an assessment of social and environmental factors that can affect nutritional status (3).

The first priority for dietary interventions should be to improve diet quality, increase food diversity, and ensure essential nutrients are consumed. School- and community-based environmental interventions may also promote healthier food choices. It is universally found that people with IDD eat less fruit, vegetables, and whole grains and more processed food than others (6,7). However, nutrition education programmes for persons with IDD and their caregivers should focus on actionable steps to improve food quality that align with the target group's needs and preferences. If deficiencies in specific nutrients are identified, dietary counselling and supplementation can be provided individually to improve the nutritional status (22).

Feeding and swallowing management represents another essential component of nutritional care for individuals with IDD. Patients with dysphagia, oral-motor dysfunction, chewing problems, or those having longstanding problems eating and drinking may need a multidisciplinary approach that incorporates the involvement of dietitians, speech-language pathologists, occupational therapists, dentists, and physicians (9). There are a number of

feeding safety and nutrition strategies that may be used to reduce the risk of aspiration and malnutrition, and to improve feeding safety, including texture-modified diets, adaptive feeding devices, oral-motor training, swallowing therapy and caregiver education (27).

Any intervention strategies to support sensory sensitivity need to consider both nutrition and behaviour. Limited food preferences and/or sensory sensitivities have been found to be a major factor in the dietary diversity and nutrition of individuals with ASD and other developmental disabilities (10,11). Behavioural feeding interventions, sensory-based therapies, food introduction and family-based feeding strategies have been shown to be promising for increasing food acceptance and dietary diversity. Importantly, the interventions must accommodate individual preferences and sensory requirements while ensuring they are nutritionally adequate.

Occupational therapists can play a role in nutrition management through nutrition education, meal planning, self-management, and engagement in health-enhancing daily occupations. Therefore, nutrition programmes based on the principles of occupational therapy provide valuable support in nutrition and wellbeing amongst adults with IDD (31). Caregivers' participation is essential to the effectiveness of nutritional interventions. There are still many individuals with IDD who are dependent on their family members or those who provide them with care to plan, prepare, and feed them, so it is important that caregivers' education and support be included in intervention programmes (13). Greater awareness by caregivers of healthy eating and feeding management, food preparation and nutritional monitoring may result in improved food quality and health outcomes over time. For adults with DD, other intervention programmes have been shown to affect health behaviours and nutrition outcomes when supported by tailored targets and behavioural supports within DD care plans (32).

Overall, the evidence reviewed shows that nutrition interventions are best tailored to each person with IDD, and that care provided by multiple health, nutrition, and community service professionals is most effective. Individualised dietary planning, feeding therapy, behavioural support, caregiver education and regular nutritional monitoring are complementary strategies that target various components of nutritional management (6,7,9,13). More than one intervention is likely to lead to better

dietary quality, feeding safety and long-term nutrition outcomes, rather than relying on just one. However, few intervention studies are well-designed to look at long-term effectiveness, especially for adults with IDD. Rigorous research is thus required in other settings to determine how these interventions can be implemented successfully.

Current evidence indicates the potential for improvements in dietary intake, feeding skills, and nutritional status with a multidisciplinary, individualised nutritional intervention for persons with IDD. The evidence base is, however, limited in scope due to small sample sizes, a variety of intervention designs, and short follow-up periods, which prevent the ability to determine long-term effectiveness and the most effective models of care. Further studies should focus on strong clinical trials and implementation studies in various health care settings.

Lifestyle Approaches Supporting Nutritional Health

A nutritional approach for people with IDD must be situated within a broader approach to a person's lifestyle, in which adapted physical education and structured physical activity are part of a more comprehensive long-term health promotion strategy, not add-ons. Thus, lifestyle-based strategies should be combined with nutrition interventions to support healthy body composition, physical functioning, metabolic health and quality of life. Lifestyle interventions should be tailored to the functional capacity, health status, choice and communication requirements, and support available within the family and community of persons with IDD.

Role of Physical Education Professionals

Adapted physical activity should also be considered as an essential part of a comprehensive nutritional approach for people with IDD. Professionals in the field of physical education are important contributors to healthy behaviours and a healthy lifestyle by developing motor competence, functional fitness, physical literacy and regular participation in physical activity, especially those specialising in adapted physical education (APE). They can describe functional deficits that impact participation, create exercise plans based on individual needs, and work with dietitians, occupational therapists, physiotherapists and other health care professionals to ensure the nutrition program is coordinated with the physical activity program. This multidisciplinary approach helps promote positive changes in body composition, metabolic health,

function and quality of life, and encourages engagement in health-promoting behaviours throughout life (33,34,35).

Physical Activity and Exercise

Exercise is an important part of nutritional management and the prevention of obesity for people with IDD. Regular participation will support healthy body composition, energy balance, physical fitness, functional capacity, and lower cardiometabolic risk. Participation is still often restricted by motor impairments, environmental barriers, lack of accessible services, and limited access to inclusive recreational opportunities (4). Children with IDD are frequently exposed to obesity risk factors at an early age and require programmes that help them develop healthy movement behaviours that will last throughout their life, though family-, school- and community-based programmes will be required (34).

The adapted physical activity programmes should be tailored to individual functional capacity, communication requirements, behavioural attributes and medical co-morbidities. Aerobic exercises, yoga, muscle-strengthening, balance, flexibility, and functional movement training can be integrated into programmes to enhance physical fitness, mobility, independence and overall health. Finally, the long-term effects of participation are further supported by behavioural strategies such as caregiver involvement, goal setting, positive reinforcement, and inclusive community participation (35,36).

The effectiveness of dietary, physical activity, and behavioural change delivered as a multi-component lifestyle intervention is gaining support. These holistic strategies have been shown to be effective for improving obesity-related outcomes, weight management, and overall health in people with IDD (37). Weight management programmes for adults with IDD that have a structured design have shown similar benefits (33), as have full weight management programmes that included nutrition education, physical activity promotion, and behavioural counselling (38). Additionally, the results of these studies confirm the benefits of combining adapted physical activity and nutrition within multidisciplinary lifestyle management.

Healthy Eating and Mealtime Practices

Other aspects of dietary habits should also be addressed in lifestyle interventions. Regular meal schedules, positive mealtime environments, and minimising unnecessary distractions and appropriate socialising opportunities during feeding time

can enhance food acceptance and mealtime experiences, especially for people with feeding difficulties or sensory sensitivities (25). Family-centred nutrition education that encourages family meals and supportive eating environments could also help increase food variety and healthier food choices.

Family, Caregiver and Environmental Support

Food and nutrition security issues should be viewed in a broader health promotion perspective. Families with IDD or individuals with IDD can have issues with availability, affordability, transportation, and getting the right nutrition services (12). Community-based changes to increase access to healthy foods, nutrition education, and nutrition support networks can help close nutritional inequities.

Family involvement is also crucial as many people with IDD rely on family members or support workers for some or all aspects of food choice, meal preparation, feeding, participation in physical activities, and health-related decision-making. Feeding issues and complex nutritional demands can also be an emotional, financial, and practical strain on the caregiver (13). Support and services for caregivers, such as caregiver education, stress-reduction services, respite services, and professional assistance, can enhance the caregivers' ability to adopt healthy eating and PA practices. Therefore, lifestyle interventions should not limit their focus to individual behaviours, but should

also address family, community, and environmental factors that influence nutritional health.

Sleep and Other Lifestyle Factors

Other lifestyle factors, such as sleep, may also affect nutritional status. Existing evidence indicates links between dietary patterns and nutritional factors and sleep quality, but the direction and magnitude of these links remain to be fully explored (39). In general, lifestyle interventions for persons with IDD should go beyond nutrition to include adapted physical activity, structured exercise, healthy eating habits, caregiver involvement, and supportive community settings. A combination of nutritional assessment, adapted physical education, and lifestyle counselling offers a holistic approach to advancing nutritional status, functional independence, and long-term health. To ensure the sustainability of interventions, interdisciplinary teamwork among dietitians, adapted physical education specialists, healthcare professionals, and caregivers is essential. Future studies should assess integrated nutrition–physical activity programmes across different populations with IDD and community settings to improve the evidence base for multidisciplinary lifestyle management (33,34,36).

The evidence-based nutritional management strategies identified from the review are summarised in Table 3 and include interventions recommended to help improve nutritional outcomes in people with IDD who require a multidisciplinary approach.

Table 3: Summary of Nutrition and Feeding Interventions Reported in the Literature

Area	Recommended strategies
Nutritional assessment	Routine screening for malnutrition, obesity, and micronutrient deficiencies (1,3)
Dietary management	Individualised meal planning and nutrient optimisation (6,22)
Food selectivity management	Sensory-based and behavioural feeding interventions (10,11)
Feeding and swallowing support	Multidisciplinary feeding therapy and dysphagia management (9,27)
Oral healthcare	Regular dental assessment and treatment (8)
Caregiver education	Nutrition training and feeding support programmes (13)
Food and nutrition security	Community-based support and access to healthy foods (12)
Lifestyle promotion	Physical activity and healthy eating initiatives: Healthy eating, regular meal routines, sleep, and supportive lifestyle practices (2,4)
Adapted physical activity and exercise	Individualised physical-activity and exercise programmes adapted to functional abilities, preferences, and support needs, including aerobic, strength, balance, flexibility, recreational, and community-based activities (34,35,36,37)
Policy and service development	Disability-sensitive nutrition services and multidisciplinary care pathways (4,29)
Weight management	Structured dietary programmes (33)
Lifestyle modification	Integrated dietary, physical-activity, and behavioural strategies (37)
Occupational therapy support	Nutritional wellness programmes (31)
Behavioural nutrition programmes	Individualised nutrition interventions (32)

The interventions outlined in Table 3 illustrate a comprehensive, integrated nutrition intervention process that involves nutrition assessment, dietary management, feeding support, caregiver education, lifestyle modification, and disability-inclusive health services. Together, these strategies help to promote healthy nutrition, safe feeding practices, and quality of life in people with IDD.

RESEARCH GAP AND FUTURE DIRECTIONS

Despite significant research over the last few decades on nutrition and people with IDD, there are still key areas that require further research. The existing literature consists of cross-sectional studies, primarily emphasising ASD, and is drawn from high-income countries, thereby limiting its applicability to the wider range of IDD and resource-poor environments (2,5). As a result, little is known about the nutritional status, dietary behaviour, feeding challenges, and health outcomes throughout the lifespan or across various health and cultural environments.

A key constraint of the existing evidence base is the lack of well-designed intervention studies. While several strategies have been suggested to tackle food selectivity in children with IDD, feeding difficulties, micronutrient deficiencies, obesity prevention, caregiver-mediated support, and lifestyle management, few studies have looked at the long-term efficacy of these strategies, especially for adults with IDD (9,24,34). Future research should thus focus on implementation research, RCTs (where applicable), and longitudinal studies to determine evidence-based nutrition interventions that are clinically and practically applicable in routine clinical and community settings.

This is because most of the available evidence is from high-income countries, and specific evidence for IDD from Africa and other low- and middle-income countries is essential to ensure culturally appropriate and equitable interventions to improve nutrition among people with IDD. Sub-Saharan Africa (SSA) also shows evidence gaps, with systematic reviews identifying persistent challenges in accessing health services, gaps in services for children with disabilities, and limited evidence of effective interventions for children with disability, highlighting the importance of context-specific studies in this region to inform policy and clinical work (30). Likewise, a study published recently and titled 'Developmental disabilities research worldwide: A scientometric review and analysis', revealed that Africa has the lowest level of research on developmental disabilities compared to all other parts of the world, indicating a need for a

more concerted effort from both the healthcare and research sectors to improve the provision of healthcare and supports for developmental disabilities across the continent (40). In addition, qualitative evidence from African families has shown that social stigma, financial difficulties and poor support systems are impacting caregiver experiences, further emphasising the importance of culturally appropriate, family-centred nutrition and disability services in African contexts (28).

Future research should take a multidisciplinary, holistic approach to examine the interactions among these factors to gain a deeper understanding of the relationships among caregiver support, socioeconomic factors, food security, health services access, and environmental factors affecting nutritional outcomes (12,29). Also, include more LMICs to enhance the global applicability and relevance of the recommendations. The ability of nutrition professionals to work closely with physicians, psychologists, speech-language pathologists, occupational therapists, educators, caregivers, and policymakers will be required to standardise nutrition assessment approaches, create disability-inclusive clinical guidelines, and create sustainable nutrition services. Interdisciplinary partnerships will be necessary to turn new research into effective clinical practice and public health policy.

LIMITATION OF THE REVIEW

The findings presented here are limited by the following considerations: it was a narrative review, so there was no formal evaluation of the methodological quality or risk of bias of the included studies. The literature reviewed varied in study designs, demographics, and outcome measures, making direct comparisons between studies difficult. Further, many existing studies are based in high-income countries, and largely on ASD, which may restrict the generalisability of the findings to other groups of children with IDD. However, this review provides a thorough overview of current research and highlights areas for future studies and clinical practice.

CONCLUSION

People with IDD have complex nutrition and feeding difficulties and are at risk for poor nutrition and health across the lifespan. This narrative review shows that nutritional vulnerability is shaped by several complex biological, behavioural, caregiver-related, and social and environmental determinants, such as micronutrient deficiencies, dietary quality, food selectivity, swallowing and feeding problems, lack of physical activity, caregiver-related factors, and limited access to nutrition ser-

vices. All these factors are linked and lead to undernutrition and overnutrition, emphasising the need for holistic and individualised nutrition care.

The findings also indicate that nutritional status in IDD is a multidimensional concept closely connected to the nutritional capacity of caregivers, food security, access to health care and other community supports. So, multidisciplinary teamwork, which involves dietitians, adapted physical educators, doctors, speech-language pathologists, occupational therapists, psychologists, dentists, caregivers and community support workers, is necessary to address these issues. These concerted efforts play a key role in enhancing nutritional status, food safety, functional ability and quality of life.

Routine assessment and screening for nutrition should be integrated into disability services to identify and manage malnutrition, obesity, micronutrient deficiencies and feeding difficulties, as early as possible, based on available evidence. In clinical practice and health policies, individual nutrition care plans, caregiver education, a multi-disciplinary approach and access to disability-inclusive nutrition services should be prioritised. Strengthening disability-inclusive nutrition services, fostering multidisciplinary collaboration, and building an evidence base across various health systems will be critical to enhancing nutritional outcomes and life for persons with IDD.

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AUTHOR CONTRIBUTION

Priyadharsni. P - Conceptualisation, literature search, data extraction, manuscript drafting, and preparation of the original manuscript.

Akilandeswari. S - Study design, supervision of the review process, critical revision of the manuscript, and intellectual content review.

Vanithamani. P - Overall supervision, review of the final manuscript.

Sakthivel. S - Assistance with literature retrieval, organisation of references, manuscript review, and editing.

Sabarish. C - Literature screening, evidence synthesis, data interpretation, and manuscript editing.

Akshay. S - Methodological guidance, critical appraisal of the literature, interpretation of findings, and manuscript revision.

All authors contributed substantially to the conception and development of the review, critically reviewed the manuscript for important intellectual content, approved the final version of the manuscript, and agree to be accountable for all aspects of the work.

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CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

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