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Empowering autonomy: exploring the transfer of lessons learned from group-based rehabilitation to everyday life for young adults with disabilities

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ABSTRACT

Purpose: To explore the rehabilitation experiences of young adults with disabilities, and identify key factors for their successful transition and integration into home and everyday life.

Material and methods: A prospective qualitative longitudinal study with two semistructured individual interviews was conducted. The study included young adults with physical disabilities who were able to communicate verbally. The participants underwent two inpatient rehabilitation stays, including daily schedules of 3–5 h of physical, social, and life skill activities six days a week. An individualized goal-oriented plan was employed during their subsequent at-home period, with digital follow-up and collaboration with local service providers as support. All interviews were transcribed and underwent inductive content analysis.

Results: Fifteen young adults (17–29 years old, ten women) participated. Three main themes emerged: expectations, experiences and challenges during and after the inpatient rehabilitation stay, and important factors for successful transfer to home life. The results demonstrated improvements in the participants' physical, self-management and social skills, but also challenges in transferring them to everyday life.

Conclusions: A coordinated support system involving family, volunteers, specialist health care and local service providers is essential for fostering a healthy lifestyle and participation for young adults with disabilities in various life arenas.

➤ IMPLICATIONS FOR REHABILITATION

- The findings highlight the importance of a comprehensive support system to enhance the well-being and participation in everyday life and social of young people with disabilities.
- Adapted physical activity, and access to assistive devices, is crucial for young people with disabilities to function and participate at their best in everyday life.
- Health literacy education is essential for balancing rest and activity, leading to improved quality of life.
- Being in a group with like-minded people who serve as role models increases motivation to participate in and enjoy physical activity.

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Introduction

The transition to adulthood places significant demands on young persons with disabilities' participation on different life arenas [1–3]. During this phase, they explore new roles and relationships while facing risks due to their disability, such as sedentary lifestyles, disrupted education, unemployment, loneliness,

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and health issues [3–6]. A European multi-center study revealed that 16.5% of young adults with disabilities had unmet rehabilitation needs, and 15% had limited access to self-help groups, highlighting barriers to services that promote autonomy and participation [7]. Autonomy can be understood as decisional autonomy, the ability to make choices without external constraint, and executional autonomy, the ability to act according to one's own will [8]. Preparations to foster autonomy should therefore begin early, with gradually increasing levels of independence as the child matures. Nevertheless, no individual is entirely independent of others. Human life is characterized by mutual interdependence, and an adult life that requires facilitation or personal assistance can be just as autonomous as one without such needs. In the context of rehabilitation, this means adopting a considerate and responsive approach that promotes informed decision-making and carefully takes into account each individual's preferences, needs, and social circumstances [8,9]. Numerous studies have demonstrated that the interplay between individual and environmental factors is crucial for a successful transition to adulthood [2,4,6,10]. These findings advocate for a life-course approach that is non-categorical with respect to diagnosis and underline that rehabilitation services needs and support do not cease when youth turn 18. On the contrary, appropriate support and services are needed to achieve and maintain the best possible health and participation potential, as defined by the International Classification of Functioning, Disability and Health (ICF) [2,11].

Unfortunately, evidence shows that the transition phase to active adult life is more complicated for young people with disabilities compared to their peers without disabilities, including both the individual and the service transitions [2,12,13]. Persons with childhood-onset disability and their families often require lifelong interdisciplinary services within the healthcare system, as well as multi-sectoral, active cooperation with social services, employment, housing, education, and community resources [2,6]. Multidisciplinary pediatric rehabilitation centers in Norway and other high-income countries typically offer systematic follow-up for children with disabilities until they reach 18 years of age. In contrast, services for adults are frequently tailored to the specific needs requested by a person with disability, imposing significant demands on the person concerned, and thus being more reactive than proactive [12]. Young adults with disabilities often feel they are alone in their responsibility to manage the transfer to adult life, lacking the necessary overview and competence [3,14–16]. The absence of adequate transitional care can leave young adults and their families to act as transition coordinators, taking responsibility for communicating between services [12]. Therefore young people's transitions to adulthood are often characterized by ambiguity and uncertainty, leading to feelings of anxiety and distress [17]. For the transition phase to work well, and to master issues related to participation, such as education, work and independent living, access to personal guidance, adequate assistive devices, effective coordination between stakeholders, and continuity in care and treatment processes are required [2,18,19].

In line with the ICF and research-based evidence, participation is crucial for health and represents the ultimate goal of rehabilitation. It can be understood as an individual's frequency of participation in life roles and level of involvement as described by the Family of Participation Related Construct (fPRC) [20,21]. According to the fPRC, various factors influence participation, including activity preferences and competence, and environmental factors like social support, assistive devices, economic resources and the contexts in which participation occur [20]. Participation can also be understood as an entry point (a "developing process") and an outcome (endpoint) of health and education services, involving both person- and environment-focused processes [20–22]. In the transition from adolescence to adulthood, participation in everyday life is critical for personal development such as developing essential life skills, stabilizing mental health, building relationships, gaining a sense of responsibility and independence and learning to navigate society [2,19,23,24].

Previous studies have identified several individual and environmental factors as facilitators and barriers to self-sufficiency and participation during the transition into adulthood for persons with inborn or childhood onset disabilities [3]. Individual factors like competence and motivation to carry out self-management tasks (e.g., medication administration, symptom monitoring, self-advocacy) are essential [17]. Studies have also shown that environmental factors such as social support from professionals, mentorship from peers with lived experience, or being part of a group with like-minded people can be crucial for developing self-understanding, finding opportunities and navigating life with a disability [2–4,25–31]. These factors feature in the group based inpatient multidisciplinary rehabilitation programs at Norway's Beitostølen Healthsport Center (BHC), which focuses on opportunities rather than limitations. These include rich learning and social opportunities to work toward personal goals while participating in adapted physical activity (APA) groups, combined with social guidance, educational support, and medical care [14–16,26,32–34].

In general, persons with disabilities tend to be less physically active than persons without disabilities [35–38]. This not only challenges these persons' functional level due to the physical disabilities themselves but also threatens an inactive or sedentary lifestyle, thereby creating a public health issue [35,38–40]. Numerous studies have demonstrated the benefits of APA for persons with disabilities and the importance of cultivating an identity as a physically active person [37,41–43]. Research has also shown that the benefit of APA extends to other areas of participation and contributes to quality of life and overall life coping strategies [33,37,39,41,42,44,45]. A systematic review of the perspectives of parents of youth with disabilities regarding physical activity highlights the crucial role of parental support in encouraging physical activity [46]. Additionally, the review emphasizes the necessity for parents to collaborate with professionals who can teach their children how to be active. Similar results were found in two Norwegian studies on a comparable population, where children with disabilities focused on their own preferences, friendships and enjoyment as main facilitators for participation in physical activities [47,48].

In the literature, *transition* is defined as the phase when adolescents become (young) adults, or as the process when adolescents and young adults with chronic medical and physical conditions move from child-centered to adult-oriented healthcare systems [1–3,49,50]. A successful *transfer* can be understood as how a person takes advantage of the new skills and competences achieved in one context, to another context [34,51]. Exploring young adults' personal experiences with both transition and transfer is important for improving the effects of their goal-oriented rehabilitation on participation in everyday life. Therefore, this study aimed to investigate young adults' experiences during a rehabilitation period, with a focus on identifying key factors that contribute to successful rehabilitation in the transition phase and transfer to the home environment and everyday life.

Methods

Study design

This qualitative prospective longitudinal study was conducted from 6 November 2019 to 29 October 2021. The consolidated criteria for reporting qualitative research (COREQ) were used to ensure transparent reporting of the data [52].

Study population

Young adults with a broad range of disabilities who were referred to BHC for a specific inpatient rehabilitation program (described in the following section) were continuously invited to participate in the study if they met the following inclusion criteria: age 17–30 years, with a physical disability with no or minor cognitive impairment and was expected to have positive cost/benefit effects from the rehabilitation program (Figure 1). Cognitive function was based on the descriptions provided by the referring physician, including information about the participant's education and independence in self-care skills. Participants were excluded from the study if they had moderate to severe cognitive impairments, were unable to communicate *via* speech and the digital application or had no interest in participating in the rehabilitation program under study. This decision was based on ethical considerations, emphasizing the

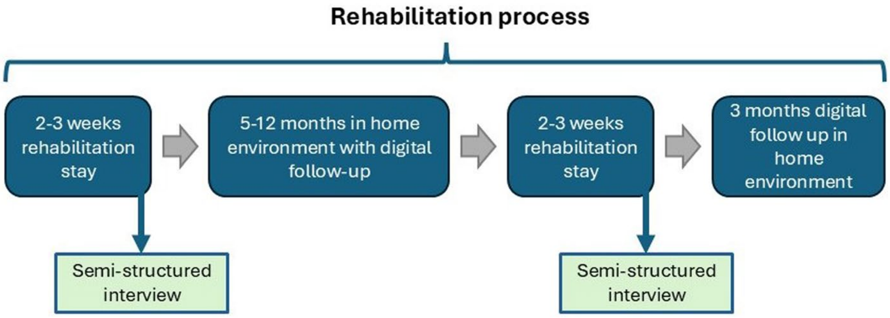

Figure 1. The rehabilitation process of the "Find your track" project.

importance of ensuring that participants fully understood their involvement and were able to express themselves in a way that allowed them to be adequately understood.

As there is no consensus about sample size in qualitative research [53], a sample size of 10–15 participants was determined as adequate to reach data saturation [34,51].

The study protocol and consent form were approved by the data protection supervisor (project number 857487) and received confirmation from the Regional Ethics Committee (REC Sør-Øst B 63565). All participants gave their written informed consent before study enrollment.

Context and intervention

This study is part of the developmental and quality project, "Find Your Path", which was carried out from September 2019 to December 2022 [54]. In general, the "Find your Path" project aimed to develop an inpatient rehabilitation program tailored to the life situations and challenges of young adults with disabilities in the transition to adulthood, as well as to strengthen the transfer of the lessons they learned from inpatient rehabilitation to the home environment.

This study was conducted at BHC, a private nonprofit foundation that provides specialized rehabilitation services nationwide for children, adolescents, young adults and adults with various diagnoses, disabilities, and functional levels, all covered by Norway's universal health coverage. Patients at BHC are admitted following approval from public specialist physicians in physical medicine and rehabilitation, neurology, or pediatrics. A key criterion for admission is the need for intensive specialized rehabilitation that exceeds the resources, expertise, and facilities available through municipal health and care services.

The specialized multidisciplinary inpatient rehabilitation programs at BHC emphasizes positive mastery experiences facilitated by both the group members and the multidisciplinary team [14–16,26,34]. Additionally, several BHC rehabilitation programs involve local collaboration with school personnel, physical- and occupational therapists, coaches in leisure and sports activities, rehabilitation coordinators and volunteer organizations (i.e., organizations that consist of volunteer groups) [26,32,34].

The program under study included two 3-week inpatient rehabilitation stays at BHC, with individualized follow-up by a BHC professional *via* the digital smartphone app FlowZone® [55] in between. Figure 1 offers a visual presentation of the rehabilitation program.

The inpatient rehabilitation periods featured an intensive schedule of 3–5 h of physical, social and increasing life skills/health competency activity per day, 6 days per week, as well as a voluntary social program in the evenings [14]. The adapted physical and social activities were goal-oriented and developed in collaboration with the group participants, tailored to their individual goals and preferences, to foster a supportive and engaging environment for all participants [14,26].

The goal-setting process adhered to clinical routines informed by evidence-based practice in physical and rehabilitation medicine, as well as previous research conducted at BHC [56–59]. More specifically the goals were negotiated collaboratively between the participant and the multidisciplinary team, including a designated BHC contact person using the SMART framework to ensure they were Specific, Measurable, Achievable, Relevant, and Time-based [56]. The first goal-oriented rehabilitation plan was created at the beginning of the inpatient stay and revised throughout the inpatient period. By the end of the third week, a subsequent plan for the home-based phase specified follow-up activities and served to guide both participants and their local support networks. Below is a summary of the inpatient rehabilitation program's main content, from which the participants' rehabilitation goals were derived:

- **Physical activity and health literacy:** APA and skill training [60 p. 24, 61], included sessions on health literacy, covering themes such as understanding one's own diagnosis and improving or maintaining physical fitness. It also addressed developing and incorporating good routines for physical exercise, diet, sleep pattern and balancing activity and rest.
- **Assistive devices for physical activity:** Testing, adapting and skill training in the use of suitable assistive devices [43].
- **Physical and mental health**: Balancing and organizing daily life in terms of work, study and activity. Support and assistance in applying for health and social services.

- **Capability and motivation for work, education and physical activity**: Guidance on work/education and physical activity; advice on CV and application writing; and career counseling. Help from BHC to assess and clarify support needs, initiate processes, and contact local support services before discharge from BHC.

FlowZone® [55] was used as a support and monitoring tool in the home environment during follow-up. The primary aim of this application's use was to ensure the continuity of the processes initiated during the participants' inpatient stay, thus promoting their successful home-based rehabilitation and progress. The application facilitated two-way communication of daily challenges, support needs, activity plans, and the sharing of videos and information. This set up aimed to engage, empower, motivate and assist the young adult in modifying their behavior and maintaining healthy habits by answering queries, tracking progress, offering encouragement and giving reminders of their individual goals [62].

Procedure

Recruitment of participants were carried out by the inpatient rehabilitation program's multidisciplinary team. Individual semi-structured interviews were conducted with the young adults upon discharge from the first and second inpatient rehabilitation stays. The interview guides were developed by the "Find Your Path" research team led by R.J. All interviews were carried out by one of the authors (E.H.), a researcher and sports pedagog at BHC with over 20 years of experience working with persons with varying disabilities.

The first interview guide included open-ended questions about the young adults' expectations, concerns, and needs regarding their return home, what would be necessary, to achieve the goals they had set upon discharge. Sociodemographic information about the participant's age, housing situation and income was also collected. The second interview guide focused on the young adults' experiences of being in their home environment during the 5–12 months following discharge from their first rehabilitation stay. They were asked to reflect on what went well and what did not, what influenced achievement of their goals and any of their needs that were met or unmet.

The interviews, each lasting between 45 and 60 min, were audio recorded and took place in a meeting-room at BHC. Notes were taken during the interviews, and follow-up questions were asked to ensure that all questions and answers were understood correctly. The data were transcribed and pseudonymized using a code, with a code list created and kept separate from the original data. Before concluding each session, the interviewer and participant jointly summarized the interview [52].

Data analysis

The data underwent inductive content analysis according to Graneheim and Lundman [63,64]. One of the authors (E.H.) transcribed the interviews verbatim, and three authors (A.U., G.M., B.G.) familiarized themselves with the text data by individually reading the transcribed interviews. Subsequently, four authors (A.U., G.M., B.G., E.H.) individually extracted significant meaning-bearing units and phrases. Based on these sentences, they identified representative keywords (codes) that illustrated the young adults' experiences and key concepts. Similar keywords were grouped according to meaning, forming different preliminary categories. The analysis was an iterative process, with the authors repeatedly referring to the original transcribed text. This step was performed individually by two of the authors (A.U., B.G.), then discussed and evaluated collaboratively with all authors until consistency was achieved, the text data were accurately illustrated, and consensus was reached. Table 1 exemplifies the data's extraction into categories and subcategories. The categories were elucidated by selecting quotes to illustrate the participants' experiences.

Results

A total of fifteen young adults (ten women and five men), all 17–29 years old (median 24 years old), participated in the study. All participants had a disability that impacted their physical functioning, such as cerebral palsy, inborn/acquired spinal cord injury and different syndromes and genetic diseases. Their mobility, housing situation, occupation and income are presented in Table 2.

Table 1. Example of the extraction process from meaning-bearing units to categories and subcategories.

Question	Meaning bearing unit	Keywords/codes	Sub-category	Category
What impact has the group had during your rehabilitation stay?	I was concerned about being part of a group, but it's nice to see the variety among the others. Seeing how they handle things. It's nice not to be the only one with fatigue.	Concern Belonging Building identity	The dual nature of group rehabilitation.	Supportive and challenging aspects of group-based inpatient rehabilitation stay.
What is important for you, in your local community, after your rehabilitation stay?	Having someone to talk to and to receive support from. Having goals and getting feedback.	Support Goals Feedback	Hope for social support.	Expectancy to develop life management skills.
	That the contact person and I put forward a plan on how to continue training, based on my goals. Making a schedule. I can mostly manage myself and have what I need. Began to eat healthier food during the rehabilitation stay and must try to continue this at home.	Contact person Plan/schedule Manage myself Eat healthy	Follow-up is crucial for maintaining skills, routines and motivation.	Navigating transfer challenges after inpatient rehabilitation stay.

Table 2. Study participants ($n = 15$).

Mobility	
Walking without help or problems	5
Walking with balance difficulties	4
Using walking aids	1
Using wheelchair	5
Housing situation	
With parents or other family members	5
Alone in own home	5
Alone with support	1
With friends	1
With cohabitant/partner	3
Study, work, income (combinations are possible)	
High school/university	4
Work (full time or part time)	7
Sick leave/employment and support allowance	2
Disability benefit (full time or part time)	9

Qualitative content analysis revealed three main categories and nine subcategories emerging from the participants' statement as illustrated in Figure 2. The main categories were "Expectancy to develop life management skills", "Supportive and challenging aspects of group-based inpatient rehabilitation stay" and "Navigating transfer challenges after inpatient rehabilitation stay". Overall, the results described the participants' expectations, experiences and challenges during and after their inpatient rehabilitation stays and important factors for the transfer to home life.

Expectancy to develop life management skills

Three subcategories illustrated the participants' expectations for the rehabilitation period. The participants expressed an expectation for physical activity, learning new activities, and using assistive devices. Being part of a group, they anticipated having role models and receiving support to achieve independence. Further, they looked forward to social opportunities and finding motivation to exercise. They expected as well to learn how to live with pain, find a balance between activity and rest, and gain knowledge about what is beneficial for their bodies

Desire for adapted physical activity

The participants expressed a desire to participate in APA to improve their physical abilities. Some participants mentioned that without intensive activity and skills learning with professionals, they risk losing function and fitness. They also wished to learn new activities and obtain the right assistive devices to participate optimally in physical activities.

> It has been extremely important to experience support in skills training. To feel that I don't stand alone." (male, 22 y, on full disability benefit)

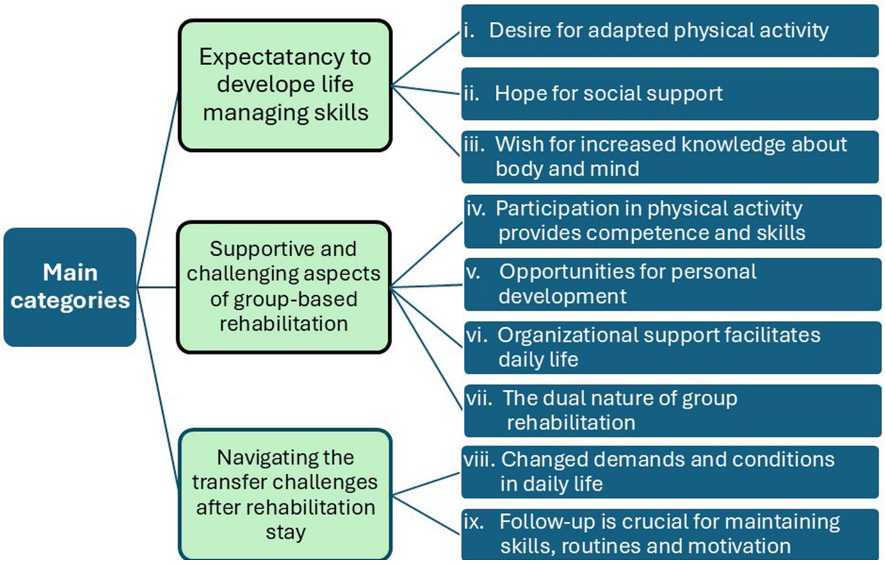

Figure 2. Three main categories and nine subcategories.

Hope for social support

The participants wanted role models who could serve as positive examples and motivate them to exercise. Social opportunities to meet new people and potentially make friends were considered important and desirable. Additionally, the participants desired support and guidance to become more independent in managing daily activities such as work, transportation and leisure activities.

> It's nice to see the variation among the others, and how they manage challenges.
> (female, 26 y, on sick leave)

Wish for increased knowledge about body and mind

Many of the young adults experienced issues with fatigue and pain, which significantly impact their daily life. They expressed a need to learn how to manage and live with pain and fatigue. They also hoped to find a balance between activity and rest to better cope with daily activities. The participants said that they would like to learn what is beneficial for the body in terms of physical activities, diet, sleep, and stress management to improve their quality of life.

> Perhaps it's time to establish boundaries, prioritize self-care and focus less on others.
> (female, 25 y, in part time paid work combined with disability benefit)

> What I anticipated the most was gaining insights into several aspects related to what is beneficial for my body and what truly does not work well for it.
> (female 25 y, with employment and support allowance)

Supportive and challenging aspects of group-based inpatient rehabilitation stay

This main category included four subcategories. The participants described that the inpatient rehabilitation stay offered a multifaceted approach to improve their quality of life, by enhancing their physical, social, and organizational skills. However, the group-based concept and group dynamics could also be demanding and energy-consuming.

Participation in physical activity provides competence and skills

The participants felt that their intensive inpatient rehabilitation stay gave them valuable experiences and increased their physical activity competence. They had the capacity to adapt new routines and learn new skills and activities, which contributed to increased confidence, joy and positive coping experiences.

Through physical activity, they also achieved increased energy levels, better sleep and preparedness to face setbacks.

> Being in a goal-oriented rehabilitation process provides motivation, mastery, meaning and knowledge to manage everyday life. (male, 29 y, on sick leave)

Opportunities for personal development

The participants described that during the rehabilitation stay they developed social competences and made new friends, which enhanced their self-confidence. They learned to ask for help and gained a better understanding of their physical and psychological strengths and weaknesses. The rehabilitation stay allowed for much-needed relaxation and self-focus as well, which they highly appreciated.

> It has allowed me to explore new activities and assess my physical limits. While I may not sustain the same level of activity at home, I have at least discovered that I can achieve more now than before this stay. (male, 22 y, on full disability benefit)

Organizational support facilitates daily life

The participants expressed that they received assistance and support in setting goals, daily planning, and organizing necessary strategies to handle daily life. They also had valuable help from social worker with filling out varying applications (e.g., social assistance, jobs) considered relevant to activity and participation in their home environment. Gaining knowledge of their rights, available services, and support in the community were also positive experiences.

> It is important to be met where I am and receive physical and organizational support to manage everyday life, work and education.
> (female, 26 y, with employment and support allowance)

The dual nature of group rehabilitation

Being part of a rehabilitation group played a crucial role in the participants' fostering of a sense of belonging and identity-building through shared experiences with like-minded persons. Additionally, the specialized staff and physical environment at BHC provided safety and a sense of belonging. However, the group setting could also be socially demanding particularly during unstructured leisure time, requiring the participants to set boundaries in spite of expectation form the other group members.

> The friends you have at home, who are healthy and such,
>
> - it's not certain that they can relate to my situation, - so it's nice to meet others in a similar situation. (female, 24 y, with part time work and disability benefit)
>
> The rehabilitation group offers a sense of belonging and identity building through the exchange of experiences but can also be energy-consuming. (female, 25 y, student)
>
> Lots, lots. I am very much influenced by the interaction in the group; I notice that a bit. I take a little too much in. When I'm social a lot, I get so tired.
> (female, 26 y, student with part time disability benefit)

Navigating transfer challenges after inpatient rehabilitation stay

This category included two subcategories describing the transfer from the inpatient rehabilitation stay to the home environment. The participants outlined their experiences with energy consuming physical and psychological adjustments, and the benefits of continuous support and follow-up in this crucial phase of the rehabilitation process.

Changed demands and conditions in daily life

The participants described the transfer back to everyday life after their inpatient rehabilitation stay as challenging. They found that managing the physical and psychological adjustments and meeting the home environment's demands and roles could be energy consuming. There was often a lack of time, energy, structure, and routines. Still, some found ways to make their everyday life work.

> I have started working 2 days a week, for 4 hours each day. It is manageable, and I am content with it. (male, 23 y, on part time sick leave and disability benefit)

Common difficulties the participants faced included finding a job, getting the right assistive device, having the energy to exercise and being social and psychologically healthy. The participants also expressed the need for continuous support from friends, family, or healthcare professionals, such as social workers, occupational therapists, physiotherapists, or doctors, to manage their disability and organize daily life.

> I've created a weekly plan with the social worker, outlining the activities I'd like to engage in, ensuring it doesn't become overwhelming. In the past, I've set overly ambitious goals, and it didn't end well. (female, 26 y, with part time work and part time disability benefit)

Follow-up is crucial for maintaining skills, routines, and motivation

The participants felt that having a contact person at BHC was valuable. The contact person acted as a pillar of support and could assist with preparation to meetings or direct communication with the Norwegian Labor and Welfare Administration, as well as help with or facilitate social- and practical help with applications. In general, having a contact person provided support, a sense of security, and internal motivation to keep going on agreed commitments related to participation, such as to continue with physical activity and tasks related to education or employment. The participants described continuity in the follow-up period as vital for maintaining routines, feeling seen and achieving energy balance. Further, knowing that someone would follow up with them on their set goals created an internal drive to achieve them, which served as a motivator as well as increased their sense of meaning and coping.

> The contact person has been of immense help. She has observed my progress and how I've changed. Yes, she has been with me consistently over time, and I truly appreciate that.
> (female, 25 y, student)

> Her extensive knowledge allows her to understand my needs very well.
> (male, 21 y, with part time work and disability benefit)

For many young adults, parents continue to serve as a crucial source of support, just as they did throughout their upbringing. However, parents often find themselves navigating unfamiliar territory and may lack the experience necessary to offer sound advice. This can lead to uncertainty, anxiety, and both genuine and unintended expressions of distrust toward their young adult.

> It will be an apartment. My parents are not quite into it, like, "how long do you plan to live there?", "do you plan to stay there?" (female, 25 y, student on full disability benefit)

The digital follow-up *via* Flowzone® had its pros and cons. The application was considered useful for monitoring interventions and providing feedback, but it was not widely used, and Mobile phone communication was sometimes an alternative. Continuous feedback and help in reaching set goals were beneficial, the participants felt, though there were some difficulties with technology and irregular contact.

> I was supposed to follow up using the app, but I couldn't manage it. There was an issue with my email; it was too full. It was very difficult.
> (female, 26 y, with part time work and disability benefit)

> The reality that they have been monitoring my progress and providing feedback has been essential for me to be able to sustain this over time.
> (female, 25 y, with employment and support allowance)

Discussion

The qualitative thematic analysis in this study identified three main categories and nine subcategories that illustrate the expectations, experiences, and challenges faced by young adults with disabilities who participated in a goal-oriented two-phase inpatient rehabilitation program, with a digital follow-up period in between. This gave valuable insight into how the participants transferred the lessons learned during inpatient rehabilitation to the home environment. The participants expected a combination of comprehensive physical activity, social support, and knowledge about managing their bodies, minds and daily life. The interview data showed that the participants perceived improvements in physical skills and self-management, enhanced social and organizational skills and possibly increased confidence about expected life skills in the transition to adulthood. However, the data also revealed that the transfer to everyday life in the community posed significant challenges, necessitating continuous support to manage and perform various tasks according to individual goals for the home period.

The participants expressed a clear desire and expectation for assistance in enhancing their physical skills and fitness, emphasizing the necessity of physical activity to maintain their health and abilities. This is not surprising, as many diagnoses causing physical disabilities involve a gradual decline in physical function over time, characterized by increasing pain and fatigue, reduced muscle strength, decreased joint mobility and increased sedentary behavior, which can lead to reduced fitness and a higher risk of health issues related to inactivity [35,36,38,45]. Research has demonstrated that insufficient physical activity is a major risk factor for non-communicable diseases such as cardiovascular diseases, type II diabetes and cancers, as well as negative effects on mental health and quality of life [36]. The necessity of physical activity underscores its role in both managing and mitigating the effects of disabilities and in preventing non-communicable diseases, and also improving quality of life, self-determination and social inclusion [37–39,41,44,45].

According to World Health Organization (WHO) recommendations, people with disabilities should engage in moderate to intense physical activity for at least 90–150 min per week [65]. Unfortunately, few young adults with disabilities meet these recommendations. Evidence suggests that among adults with disabilities, only a minority meet the WHO's guidelines for physical activity, and levels of sedentary behavior in this population are high [38,39,66]. The low adherence to the WHO's physical activity recommendations among people with disabilities suggests significant barriers to physical activity, such as a lack of assistance, inclusion and access to appropriate equipment and adapted activities [38,45,47]. This was evident in this study, where participants expressed a need and expectation for physical and social assistance in physical activities during the rehabilitation period. Previous studies have shown that people with disabilities often benefit from more time and repetitions during physical activity, and that simplifying complex physical movements can optimize their performance [34,67]. This may demonstrate the benefit of specialized inpatient intensive rehabilitation periods. Addressing these needs and overcoming barriers is essential for enhancing physical activity levels and overall health in young adults with disabilities, thus underscoring its significance as an equity and public health issue [40].

The participants also expressed an expectation to acquire skills in managing and living with pain, as well as for achieving balance between activity and rest to better cope with daily activities. Understanding the influence of lifestyle factors on health is crucial; this includes knowledge about sleep, physical activity, diet, alcohol consumption, and smoking. Additionally, grasping what a specific diagnosis might mean for an individual person's physical and mental functions is essential [68,69]. Fatigue and pain are common issues in neurological diagnoses such as cerebral palsy, making it important to know how to manage and counteract these problems [70]. Enhancing young people's disease control and health literacy to boost their self-efficacy and confidence in their ability to make changes is therefore central to the success of both their transition into adulthood and specific interventions (e.g., toward being physical active, daily routine management or study/work participation) [5,68,69].

The group-based inpatient rehabilitation stays at BHC focused on physical and mental health, aiming to help the participants balance and organize their daily lives in terms of work, study, and activities. Additionally, to enhance the participants' overall health competence and self-management, the group-based rehabilitation program emphasized energy conservation, general physical activity, support conversations, and assistance in applying for health and social services. This intervention aligns with a goal-oriented approach toward known factors that limit important young adulthood life skills and arenas of participation, such as studies and paid or volunteer work [3,71]. There is evidence that group-based rehabilitation programs with peers foster motivation to actively engage in participation processes, build courage, and promote self-reflection [4,14,15,28,30]. Furthermore, the group-based approach in the current study's inpatient rehabilitation program to learn self-management skills is consistent with research documenting the effects of interactions with more knowledgeable others (e.g., peers, parents, or professionals), and the range of skills that can be developed with guidance exceeding that which can be attained alone [2,4,13–16].

Overall, the participants described their group-based inpatient rehabilitation stays as multifaceted. They reported gains in competence and skills through physical activities, discoveries of new interests and improving fitness, energy levels, sleep habits and resilience. These improved physical and mental skills align with both previous research on similar rehabilitation programs [4,28,31] and the fPRC model, which emphasizes the importance of skill competences for autonomous participation in daily life [20,21]. Consistent with earlier research on similar programs [28,31], the participants also experienced improvements in their social competence, having made new friends and gained self-confidence and experiences in self-chosen activities. They developed a better understanding of their strengths and limitations as well, which corresponds to the intrinsic factors of sense of self and preferences in the fPRC model. Others with similar challenges became role-models and the participants also experienced being role-models for other group members. They realized what research has documented that dependence of others does not necessarily threaten their autonomy, On the contrary, they experienced interdependence with equal peers who also struggled to balance their autonomy with the need for assistance in everyday life [8,9]. Additionally, the participants expressed that the provided organizational support assisted in their application completion, goal setting, daily planning, and understanding of rights and services. The group setting fostered a sense of belonging and identity but could also be socially demanding and energy consuming. This highlights the significance of context, defined in the fPRC model as time, resources, people and places [20]. These results indicate that the components of the fPRC model are crucial in rehabilitation, where engaging in physical and social skill activities within a supportive, adaptive, and inclusive environment leads to positive outcomes.

During the rehabilitation period, participants were given the opportunity to engage in intensive training aimed at enhancing their ability to perform various physical activities, often with the support of individualized adaptations and assistive devices. It is important to emphasize that although participants improved their motor and social capacities during rehabilitation, it remains essential to ensure that these skills can be transferred and applied within their everyday environments. Challenges associated with this transfer were evident in participants' accounts. They described challenges to their need for sufficient time, energy, structure, and routines, including how the transfer from the inpatient setting to the home environment, both physically and socially, led to changes in what they were able to do during the inpatient stay (capacity) compared with what they were capable of and/or chose to do in their home environment (capability and/or performance) [72]. Common difficulties included obtaining the right adaptive devices, maintaining energy for exercise, finding a job and being social. These experiences are common among young adults with disabilities, having been described in other studies [13,29,30]. Continuous support from friends, family, and healthcare professionals was essential for managing daily life and finding the motivation to pursue various strategies for goal attainment and activity, a finding also supported by previous research [29,30]. However, both our study and previous research demonstrate that support persons must balance the need to provide support during the period when young adults strive for independence and personal development can be challenging [2,17]. For example, studies have shown that self-determination and autonomy may suffer when parents are overprotective [13,73].

Systematic follow-up was vital for maintaining skills, routines, and motivation, as stated by the participants. Having a contact person at BHC provided a sense of security and internal motivation. Other studies have demonstrated support or a contact person as important in managing change processes due to transition or transfer from one context or environment to another [3,31,71]. The consistent support through the digital application had mixed reviews from our study participants due to technological and connectivity issues, with Mobile phone being used as supplementary tools for several participants.

These findings indicate that the participants recognized and emphasized the importance of having an assigned contact person, ongoing feedback, and support to achieve their goals both during the inpatient stay and in their home environment. This support aligns with the guidelines prescribed in the Norwegian system for the "Individual Plan and Coordinator" as outlined in the Coordination Reform by the Norwegian Directorate of Health [5,31,74,75]. The Coordination Reform document [74], emphasizes the need for better integration and coordination between municipal and specialist health services to improve patient care and resource management. Additionally, the document 'Rehabilitering, habilitering, individuell plan og koordinator' by the Norwegian Directorate of Health provides guidance on rehabilitation, habilitation, individual plans, and coordinators, highlighting the importance of coordinated, interdisciplinary, and planned services to ensure quality and effective resource use. However, many young people with disabilities continue to face challenges during transfer from specialist health services to local community services, often feeling alone in managing their follow-up goals and plans. This underscores the need to enhance support and coordination among interdisciplinary healthcare services and to foster multi-sectoral collaboration with social services, employment, housing, education, and community resources. Such enhancements are crucial for addressing inequities related to disabilities as well as broader public health issues [19,40].

Study strengths and limitations

Due to this study's sample size and exploratory nature, only a few variables describing the sample were used. However, the study design and the integrated research and clinical practice setting allowed for thorough insight into the health challenges, functioning and support needs of this sample population of young adults with disabilities. Only persons referred to BHC were included in this study because it was part of a BHC internal developmental project conducted alongside an ongoing rehabilitation program. The integrated research and clinical practice setting might have biased the results with favor to those with the most challenges and rehabilitation needs. However, from a clinical experience point of view, the participants had a variety of diagnoses and health conditions, representing a diverse population of young adults with neurological and other congenital or acquired physical disabilities. Additionally, the participants came from both urban and rural areas across Norway.

The external validity of this study might be restricted to high income countries with universal healthcare coverage and similar rehabilitation programs. However, while the rehabilitation program setup may be unique to Norway as a welfare state with equal, low-cost access to public health and social services, the rehabilitation content is generic and potentially transferable to other contexts [5,15]. This includes a focus on improving young adults' health literacy, group-based APA, information about services and rights, support from a contact person and digital follow-up. The findings' applicability may be influenced by the recruitment procedure as well, where the multidisciplinary team recruited relevant participants from those referred to BHC. A limitation to the external validity is that persons with cognitive and/or speech impairments were excluded from the study. It is most likely that this group would experience additional challenges with the transition to adult life. However, individuals with speech impairments and no/minor cognitive impairments could have been included if accommodations for augmentative and alternative communication (AAC) had been made. This could be considered selection bias; however, its exact impact on the results remains unclear. The interview technique may have influenced the type and amount of information provided by the participants as well. Though we assume this did not significantly affect the results, as the study's methodology was transparently presented in line with the COREQ guidelines [52]. The results' credibility was considered good as well, since the data collection processes addressed the intended focus of the project, the participants had varying experiences, and the data analyses ensured that the meaning-bearing units were neither too broad nor too narrow and arose from representative quotations.

The usefulness of the digital application FlowZone® could have been enhanced through piloting and adopting a more systematic approach during the preparation period (the last week of the first inpatient stay). For example, the application could have been tested to ensure it functioned as intended for everyone's needs. Despite the participants' varying experience with FlowZone®, digital applications, including FlowZone® itself, have been shown to be useful for increasing physical activity and adherence to interventions through effective monitoring and follow-up [62]. Nevertheless, before implementation, it is important to ensure that any digital application is user-friendly and functional for both staff and persons with disabilities [76,77].

The findings were communicated to the staff at BHC throughout and at the end of the project. This knowledge dissemination was conducted in a systematic internal training program and competence building, and as more informal dialogue and experience sharing in daily practice. In addition, the FlowZone® application is now implemented as a part of the follow-up routine after an inpatient stay at BHC.

Conclusion

Transitioning to adulthood poses significant challenges for young adults with disabilities, indicating the need for continuous, structured support during this period. This study highlights the need to continue rehabilitation services beyond age 18 to maintain good health and meaningful participation for this population, all according to the ICF framework. The assessed inpatient rehabilitation program provided a comprehensive approach involving APA and personalized goals, effectively fostering skill development, motivation, and social engagement throughout the rehabilitation period. However, the transfer to everyday life remained challenging, necessitating ongoing support and coordination among healthcare providers, social services, and personal networks. Emphasizing physical activity among people with disabilities is crucial, as it mitigates sedentary lifestyle risks and enhances quality of life. Ultimately, a focus on personal guidance and effective collaboration can ease transitions and transfers, promote resilience and empower young adults with disabilities to navigate their adult lives with confidence and autonomy.

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Author contributions

CRediT: **Grethe Månum**: Conceptualization, Formal analysis, Visualization, Writing – original draft, Writing – review & editing; **Berit Gjessing**: Conceptualization, Formal analysis, Validation, Writing – original draft, Writing – review & editing; **Ellen Hæhre**: Conceptualization, Data curation, Formal analysis, Investigation, Validation, Writing – review & editing; **Reidun Jahnsen**: Conceptualization, Formal analysis, Project administration, Supervision, Validation, Writing – review & editing; **Astrid Nyquist**: Formal analysis, Validation, Writing – review & editing; **Anna Ullenhag**: Conceptualization, Formal analysis, Validation, Writing – original draft, Writing – review & editing.

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