

Impact of Assistive Technology Lending Banks: A Systematic Review

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Abstract

Access to assistive technology (AT) remains a major global challenge, with only 10% of people in need having access to essential devices. Free loan banks of assistive products have emerged as a strategy to promote equitable access, reduce costs, and improve autonomy and quality of life. This systematic review aimed to synthesize the available evidence on the impact of free loaner assistive device programs. A comprehensive search, following PRISMA guidelines, was conducted in Medline, Web of Science, and Scopus. Eight studies met the inclusion criteria, covering diverse populations and study designs. The results suggest a positive influence of these programs on autonomy, social participation, and quality of life, with a high demand for mobility and augmentative communication devices. Programs that incorporated interdisciplinary professional support reported better device-person matching, lower abandonment rates, and higher user satisfaction, as measured by tools such as PIADS, QUEST, and the MPT model. Moreover, loan programs demonstrated economic sustainability through reuse strategies, achieving up to 55% cost reduction. Despite these benefits, challenges remain, including unequal access, financial sustainability, and lack of standardized evaluation tools. Strengthening research, policy support, and professionalized management is essential to ensure the long-term success and scalability of AT loan programs.

Keywords: assistive technology; mobility aids; equipment reuse; assistive device loan programs; wheelchair loan programs; quality of life



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1. Introduction

In 2016, the World Health Organization (WHO) highlighted the importance of assistive products through the Global Cooperation on Assistive Technology (GATE) initiative [1]. This initiative aims to ensure that all individuals, particularly those with disabilities, have equitable access to assistive technologies (ATs), enabling them to improve their quality of life (QoL), independence, and social participation. As part of this strategy, the WHO developed the Priority Assistive Products List, identifying the 50 most essential devices to meet basic health and social well-being needs [2]. However, access to these products remains highly limited, with only one in ten people who need them being able to obtain them [3]. A paradigmatic case is that of wheelchairs: according to WHO estimates, only

between 5% and 15% of the 70 million people who require them can access one [3]. The WHO has emphasized the need to establish and support community-based initiatives, including assistive technology lending services, as a key strategy to reduce global inequities in access to AT, especially in low- and middle-income countries [3].

This access gap is associated with multiple factors, including economic, geographical, social, and informational barriers, and is further exacerbated by current sociodemographic changes. Population aging, increased life expectancy, and the rising prevalence of chronic diseases and accidents have significantly increased the demand for assistive products and related services [4,5]. In this context, it is essential to develop resources and services that not only ensure the availability of assistive and orthopedic devices but also include the training of specialized professionals to assess, advise, and guide individuals in their appropriate use. In the context of current social movements and considering Sustainable Development Goals (SDGs) 3 and 10, access to support products is promoted and reinforced as part of the right to health, being considered fundamental for people with disabilities to live fully in society and guaranteeing universal health coverage. On the other hand, if we consider what is reflected in SDG 10, access to support products would be key to promote the inclusion of people, regardless of their economic or health situation, trying to mitigate the current inequalities that encompass health, in general, and access to assistive technology, in particular [6–8].

On the other hand, in terms of resources, in response to these scenarios, several initiatives have been launched to ensure access to support products. One prominent example is the development of assistive product reuse and lending programs [9–12]. These services provide access to assistive devices temporarily, offering an economically viable alternative for users and families who would otherwise face significant financial challenges in acquiring these products. Beyond reducing associated costs, these programs promote social inclusion, autonomy, and well-being among beneficiaries. In specific groups, such as individuals with intellectual disabilities, Amyotrophic Lateral Sclerosis (ALS), and neuromuscular diseases, such programs are already in place [12]. Their main goal is to distribute second-hand assistive products with a threefold purpose: to provide free access to essential devices, support the management of progressive conditions, and promote the circular economy through reuse and recycling.

The establishment of these services represents a comprehensive strategy that integrates improved access to AT with environmental sustainability, as highlighted in some studies discussing these interrelated concepts [12].

Previous research has demonstrated that lending services linked to AT not only enhance users' quality of life and autonomy [13] but also alleviate the financial and emotional burden on their families [14]. Additionally, recent studies have identified further benefits, such as reducing the negative psychosocial impact and costs associated with informal caregiving [15]. Despite some scientific evidence supporting the impact of these programs, there is a notable scarcity of research in this field, particularly of well-designed studies assessing their effectiveness. In this regard, the application of standardized outcome measurement tools, such as the Psychosocial Impact of Assistive Devices Scale (PIADS) or the Matching Person and Technology (MPT) model, is essential to assess the effectiveness of AT interventions and prescriptions. Incorporating these tools can strengthen the evidence base and guide service improvements, optimizing the global support that the user of this AT is receiving. Therefore, generating and analyzing data to support the development of assistive product lending programs is becoming crucial.

In this context, the primary objective of this systematic review is to provide an in-depth analysis of free AT lending programs and synthesize existing knowledge to understand their impact. Specifically, this study aims to evaluate how these programs contribute to

improving the quality of life of beneficiaries, identify the most requested assistive products, explore different management models, and highlight the strategies and professionals involved in their successful implementation.

Although various assistive technology lending and reuse initiatives exist in different regions of the world, the scientific evidence regarding their functioning and impact remains limited and fragmented. Therefore, this review aims to provide a useful reference framework for researchers, policymakers, and professionals in the health and social care sector.

The main contributions of this systematic review are as follows:

- (1) It synthesizes the effects of free assistive technology lending programs on users' autonomy, quality of life, and social participation.
- (2) It examines the different existing management models, identifying their advantages, limitations, and key implementation factors.
- (3) It describes the most in-demand assistive devices and user profiles, as well as the main barriers to access.
- (4) It analyzes the role of professional teams and their influence on device suitability, usage, and user satisfaction.
- (5) It provides recommendations to strengthen the sustainability, efficiency, and equity of these programs from a public health and social justice perspective.

The remainder of this article is structured as follows: Section 2 describes the methodology used, based on the PRISMA guidelines; Section 3 presents the results derived from the analysis of the included studies; Section 4 discusses the most relevant findings, their practical implications, and current challenges, as well as the methodological limitations of the study; Section 5 summarizes the main conclusions of the research.

2. Materials and Methods

2.1. Search Strategy

This systematic review was conducted according to the Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA) guidelines [16]. For this purpose, a systematic review of the studies published from the beginning of each database until February 2025 was carried out.

A literature search on relevant studies was performed independently by two co-authors using three online databases: Medline, Web of Science, and Scopus.

The set of keywords used in the searches was "assistive technology", "mobility aid", "orthotic device", "mobility device", "assistive product", "wheelchair", "adjustable bed", "transfer aid", "disability", "loan service", "loan equipment", "assistive device bank", "loan library", "loan bank", and "reuse program", which were integrated into the following search formula: (("assistive technolog*" OR "mobility aid*" OR "orthotic device*" OR "mobility device*" OR "AT" OR "assist* product*" OR "wheelchair*" OR "adjustable bed*" OR "transfer aid*" OR "disab*") AND ("loan service*" OR "loan equipment" OR "assistive device* bank" OR "Loan librar*" OR "loan bank*" OR "reuse program*")).

The same search strategy was applied to all selected online databases, and duplicates were removed. The titles and abstracts were assessed for eligibility criteria, while the full-text articles were retrieved and assessed for relevance.

2.2. Inclusion Criteria

In accordance with the inclusion criteria, no publication date limits were applied; thus, all publications were accepted regardless of year. The articles included for review were peer-reviewed and published in English, French, Spanish, or Portuguese. Only studies

with a sample of people with dependence and disability, children, adults, and older people, requiring the loan of any AT free of charge, were included.

In terms of study design, this review included original empirical studies with quantitative, qualitative, or mixed-methods approaches. Systematic reviews, meta-analyses, case reports, and opinion pieces were excluded.

ATs assessed and prescribed through research included all those products listed as such in the ISO standard.

In addition, articles were also accepted where the sample consisted of professionals who manage services and/or programs for the free loan of assistive products.

2.3. Exclusion Criteria

Concerning the exclusion criteria, documents that did not appear as original articles were discarded from the review. Additionally, scientific articles published in languages other than English, Spanish, French, or Portuguese, as well as duplicate entries across the three reference databases, were excluded from the review.

3. Results

As shown in Figure 1, 464 results were initially identified. Of these, 214 were discarded due to document type, language of publication, or duplication between the various databases used in the study. Subsequently, an analysis was performed based on the titles and abstracts of the remaining 250 records. At this stage, 239 documents were excluded, mainly because they were not related to the subject of interest or did not meet the criteria of document type. In the next phase, a full-text review of the remaining 11 documents was carried out. Of these, five were eliminated (see Supplementary Table S1). In addition, a snowballing strategy was applied to identify potentially relevant studies. This procedure was carried out by screening the reference lists of the six full-text articles initially included. A total of 206 citations were reviewed, of which 10 were selected for full-text evaluation. After applying the same inclusion and exclusion criteria, two studies were included. Therefore, the review is composed of eight studies. Study characteristics are described in Table 1.

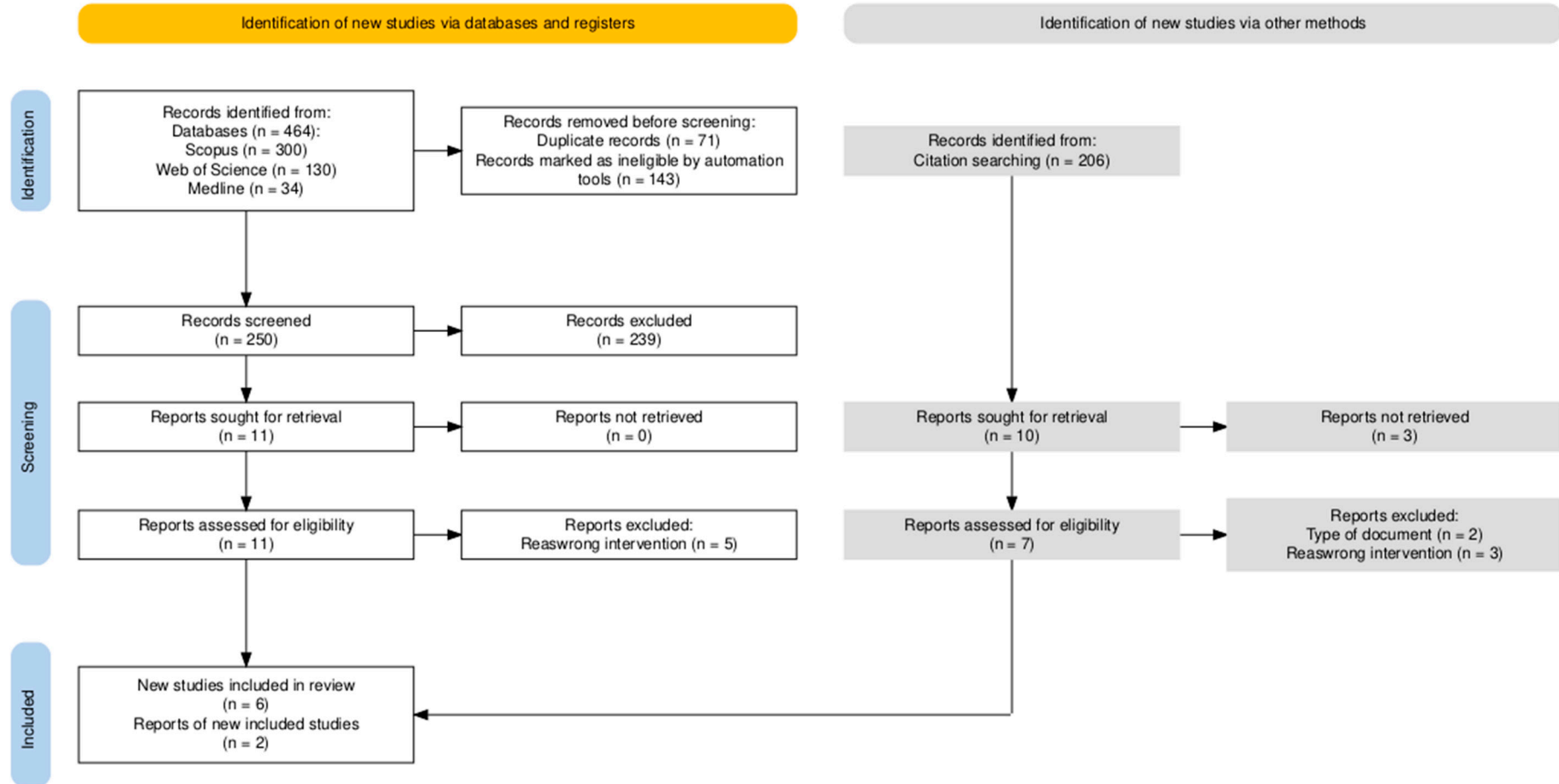


Figure 1. PRISMA flow chart for the search and selection of studies [16].

3.1. Characteristics of the Studies

A total of eight studies performed in different countries, including the United States, Canada, Spain, South Korea, and China, were selected (See Table 1).

Unlike other systematic reviews, it was not possible in the present study to calculate the total number of participants, their sex, or their age, as not all the included articles reported these characteristics in detail. However, it can be noted that the number of participants varied widely, with some studies reporting between 19 and 1234 participants [17,18]. In studies that reported sex distribution, the participants were approximately equally divided between males and females. The ages of participants ranged from young children [19–21] to older adults [17,18,22–24].

All selected studies involved populations in situations of disability, including individuals with neuromuscular diseases [21] and ALS [22], patients undergoing dialysis [18], and those with intellectual [17] and physical disabilities [19], as well as professionals involved in the care or support of these groups. These professionals were primarily occupational therapists, rehabilitation specialists, early intervention providers [19,20,23], and healthcare technicians [24].

The studies included various designs such as descriptive cross-sectional [17–19,22,23], quasi-experimental studies [20], retrospective [21], and exploratory descriptive [24]. Evaluation tools varied and included surveys, semi-structured interviews, specific questionnaires, and functional assessment tools.

The ATs evaluated included mobility devices [17,19–21,23,24], augmentative and alternative communication devices [17,19], environmental control equipment [17], and daily living aids [19]. The main outcomes indicated improvements in independence [20,22,23], community participation [20], and quality of life for the users [17,19–23].

Table 1. Characteristics of the studies analyzed.

Author, Year, Country	Type of Study	Purpose	Participants	Assessment Tools	Type of Assistive Technology	Study Variables Related to Quality of Life	Main Outcomes	Implications for Practice
Cho et al. (2004), South Korea [18]	Cross-sectional	Evaluate the current state of dialyzer reuse practice in Korea	Surveys conducted in 29 dialysis centers ($n = 1234$). Age and sex not specified; included hospitals and independent units	Questionnaires sent to hemodialysis facilities	Dialysis equipment	Increased independence and community participation thanks to access to assistive devices	Only 7.7% of hemodialysis facilities in Korea reused dialyzers; 6.2% of hemodialysis patients used reused dialyzers. The average number of reuses per dialyzer was 15 (range 10–22), with a maximum of 20 reuses (range 10–50)	Dialyzer reuse enables cost reduction and access to high-flux membranes. Quality guidelines and control are essential to ensure safe and effective reuse.
Cohen & Perling (2015), USA [23]	Cross-sectional	Identify barriers to accessing mobility devices through reuse programs	$n = 49$; mean age: 53.7 years (SD 17.0); 53% women, 47% men	Structured interviews	Manual and electric wheelchairs, walkers and canes, scooters, adjustable beds, hoists, and transfer boards	Improves independence, mobility, and community participation; reduces caregiver dependence and risk of injury due to lack of appropriate equipment	80% had difficulty obtaining a medical evaluation for their mobility device; 61% could not navigate the medical insurance system; 22% could only afford the device through the reuse program; 31% experienced pain or physical harm due to a lack of an appropriate device	AT reuse programs should include professional support to help users access benefits and educate the public and healthcare providers on obtaining and evaluating mobility devices.
Hongyin et al. (2008), China [21]	Retrospective descriptive	Describe the implementation and management of a wheelchair bank over a 10-year span	$n =$ not specified; children with neuromuscular diseases (CP, DMD, SMA, SB); mean 10 years (1–20 years)	Clinical records, computerized database, loan/return statistics	Wheelchairs (manual, powered, positioning) and adaptive components	Access to technology, prevention of deformities, improved mobility and participation, and cost savings	The wheelchair bank provided rapid delivery of specialized seating systems, achieved a cost reduction of up to 55.7%, and enhanced postural support through customized fittings; moreover, it enabled efficient reuse of equipment by providing, on average, four different wheelchair sizes per client—accommodating growth and reducing overall maintenance needs through effective inventory management	Replicable model that optimizes resources and reduces costs, ensuring personalized interventions through centralized information management and the coordination of rehabilitation professionals.
Livingstone & Field (2023), Canadá [20]	Pre-post	Measure and compare progression in children's power mobility skills among process and task-based measures following a loan of early power mobility devices	$n = 46$ children aged 13–68 months (mean 40.40; SD 15.60); 71.74% had cerebral palsy	ALP, PMP, PMTT, GMFCS, MACS, CFCS, LSS	Early power mobility devices: Wizzybug, Bugzi, Tiger Cub power wheelchair, switch-adapted ride-on toy cars	Progression in power mobility skill, associations among power mobility skill measures, child and environmental factors influencing ALP phase at loan-end	Positive change in power mobility skills for 84.78% of children. Significant associations between ALP and PMP/PMTT. Device type, access method, diagnostic group, and communication abilities influenced the ALP phase at the loan-end	ALP is useful for assessing power mobility skill progression. PMTT is most useful for early learners, and PMP for functional learners. Recommendations for extended practice and consideration of child profiles and access abilities.

Table 1. Cont.

Author, Year, Country	Type of Study	Purpose	Participants	Assessment Tools	Type of Assistive Technology	Study Variables Related to Quality of Life	Main Outcomes	Implications for Practice
Mahmood et al. (2024), USA [17]	Cross-sectional descriptive	Explore the accessibility of AT for individuals with intellectual disabilities through AT loan libraries	<i>n</i> = 19; 8 users, 3 caregivers, and 8 professionals, aged 18–64; 50% female, 21.4% non-binary, 14.3% male; type of disability: 42.9% intellectual disability, 42.9% learning disability, 35.7% physical disability	Semi-structured interviews and self-designed questionnaires	AAC devices, manual and electric wheelchairs, adapted switches and mice, environmental control devices, and feeding utensils	Greater functionality in daily life and positive psychosocial impacts	68% of users found loan libraries facilitated access to appropriate AT; 42% reported excessive wait times; 37% indicated insufficient training on device use; 53% of professionals mentioned limited device variety	AT loan libraries improve access but face challenges like limited devices, wait times, and training. Better policies, funding, and collaboration are needed for fair, effective access.
Ordway et al. (2020), USA [24]	Exploratory descriptive	Investigate how hospitals manage unwanted durable medical equipment (DME) and how healthcare providers perceive their role in preventing waste of these equipment	Semi-structured interviews with 12 rehabilitation professionals and a focus group of 7 rehabilitation professionals, hospital waste managers, and technicians	Hospital-based DME reuse program in partnership with a community medical equipment recycling organization	Walkers, manual and electric wheelchairs, shower stools, adjustable beds, canes, and crutches	Improves DME accessibility for underserved individuals, facilitating hospital discharge and reducing readmission risks due to lack of appropriate equipment	Cost reduction with reuse programs: up to 55.7%; main barriers: lack of recycling education for patients and staff, safety and hygiene concerns; hospitals with reuse programs: implement repair, donation, and parts recycling strategies; little information provided to patients about reuse options	Rehabilitation providers should be trained in environmentally sustainable health practices and educate patients on how to manage their unwanted DME.
Pousada et al. (2021), Spain [22]	Cross-sectional	Evaluate the impact of assistive devices from a loan bank on the lives of people with ALS and NMDs and analyze the correct matching between the person and technology	<i>n</i> = 28; mean age: 58.9 years; men: 15 (53.6%), women: 13 (46.4%); ALS: 23 (82.1%); NMDs: 5 (17.9%)	Self-developed questionnaire, PIADS, MPT tool	Adjustable beds, wheelchairs, walkers, and transfer hoists	Access to assistive products improves autonomy, inclusion, and participation in society	The highest-rated dimension in PIADS was competence (mean = 0.6). Correct matching between person and technology positively influenced outcomes. The overall match between the individual and the AT was good (MPT mean = 3.94/5)	Correct prescription by an experienced professional is vital for achieving a good match between person and technology; loan banks of ATs should be considered a valid service that complements the lack of public health services.
Wilcox et al. (2013), USA [19]	Cross-sectional	Gather information from early intervention and early childhood providers about their experience with AT reuse programs	<i>n</i> = 256 early intervention and early childhood providers; 73% worked with children aged 0–2 years, 27% with children aged 3–5 years	Online surveys	Infants and young children: AT for mobility and positioning. Preschool children: AT for communication. Both groups: environmental control, feeding, socialization, daily living aids, visual aids and supports, and assistive listening	Facilitates environmental control, socialization, feeding, daily living activities, access to visual and auditory supports, and assisted listening, thereby contributing to improved participation, communication, and autonomy	75.7% never used formal reuse programs; difficulties: access to appropriate devices, insufficient information, and lack of maintenance	Early intervention and education providers reuse AT within their own programs but with certain limitations. It is suggested to strengthen regional programs and expand reuse to low-tech ideas and devices.

AAC: Augmentative and alternative communication; ALP: Assessment of learning power; ALS: Amyotrophic Lateral Sclerosis; AT: Assistive technology; CFCS: Communication Function Classification System; CP: Cerebral palsy; DMD: Duchenne Muscular Dystrophy; DME: Durable medical equipment; GMFCS: Gross Motor Function Classification System; LSS: Level of Sitting Scale; MACS: Manual Ability Classification System; MPT: Matching Person and Technology; NMDs: Neuromuscular diseases; *n*: Sample size (number of participants); PIADS: Psychosocial Impact of Assistive Devices Scale; PMP: Power Mobility Program; PMTT: Power Mobility Task Tool; SB: Spina Bifida; SD: Standard deviation; SMA: Spinal Muscular Atrophy.

3.2. Quality Assessment and Data Extraction

All studies selected for this systematic review underwent a methodological quality assessment using the Joanna Briggs Institute (JBI) critical appraisal tools [25]. This process ensured the rigor and validity of the included studies, guaranteeing the reliability of the findings presented. In this case, cross-sectional studies were assessed using an eight-item scale, analytical qualitative research with a maximum score of 10 points, and analytical quasi-experimental studies with a maximum score of 9 points. The score is given according to the number of “Y” obtained in each item. The results of this analysis can be found in Table 2.

Table 2. The Joanna Briggs Institute (JBI) critical appraisal checklists.

For Analytical Cross-Sectional Studies											
Study	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Score		
Cho et al. (2004) [18]	Y	Y	U	U	N	N	U	Y	3/8		
Wilcox et al. (2013) [19]	Y	Y	U	U	N	N	U	Y	3/8		
Cohen & Perling (2015) [23]	Y	Y	Y	Y	N	N	Y	Y	6/8		
Pousada et al. (2021) [22]	Y	Y	Y	Y	U	N	Y	Y	6/8		
Mahmood et al. (2024) [17]	Y	Y	U	U	N	N	U	Y	3/8		
Hongyin et al. (2008) [21]	Y	Y	Y	Y	N	N	Y	Y	6/8		
Q1: Were the criteria for inclusion in the sample clearly defined?; Q2: Were the study subjects and the setting described in detail?; Q3: Was the exposure measured in a valid and reliable way?; Q4: Were objective, standard criteria used for measurement of the condition?; Q5: Were confounding factors identified?; Q6: Were strategies to deal with confounding factors stated?; Q7: Were the outcomes measured in a valid and reliable way?; Q8: Was appropriate statistical analysis used?											
For Analytical Qualitative Research											
Study	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Score
Ordway et al. (2020) [24]	Y	Y	Y	Y	Y	N	N	Y	Y	Y	8/10
Q1: Is there congruity between the stated philosophical perspective and the research methodology?; Q2: Is there congruity between the research methodology and the research question or objectives?; Q3: Is there congruity between the research methodology and the methods used to collect data?; Q4: Is there congruity between the research methodology and the representation and analysis of data?; Q5: Is there congruity between the research methodology and the interpretation of results?; Q6: Is there a statement locating the researcher culturally or theoretically?; Q7: Is the influence of the researcher on the research, and vice versa, addressed?; Q8: Are participants, and their voices, adequately represented?; Q9: Is the research ethical according to current criteria or, for recent studies, and is there evidence of ethical approval by an appropriate body?; Q10: Do the conclusions drawn in the research report flow from the analysis, or interpretation, of the data?											
For Analytical Quasi-Experimental Studies											
Study	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Score	
Livingstone & Field (2023) [20]	Y	Y	N	N	Y	Y	Y	N	Y	6/9	
Q1: Is it clear in the study what is the “cause” and what is the “effect”?; Q2: Were the participants included in any comparisons similar?; Q3: Were there any control groups?; Q4: Were the outcomes measured in a reliable way?; Q5: Was follow-up complete, and if not, were differences between groups in terms of their follow-up adequately described and analyzed?; Q6: Were outcomes measured in the same way for participants across study groups?; Q7: Were outcomes measured in a valid and reliable way?; Q8: Was the intervention clearly applied and consistently delivered across participants?; Q9: Were appropriate statistical analyses used?											

With respect to the application of the Joanna Briggs Institute’s tool to analyze the methodological quality of studies, we identified several recurring weaknesses. One of the most common is a lack of clarity in identifying the factors that could influence the results. We also observed limited use of statistical analysis and incomplete descriptions of the contexts in which the research was conducted. These limitations make the interpretation of results difficult and increase the risk of bias. Therefore, it is important to conduct more consistent research in the field, which will help to generate more solid evidence on these types of programs.

3.3. Assistive Technology Loan Programs: Frameworks, User Demand, and Implementation Challenges

AT loan and reuse programs have emerged as a key strategy to reduce access barriers, particularly for individuals with disabilities who face economic limitations or challenges

within healthcare systems. Such initiatives help to address common challenges, such as the high cost of devices, lack of insurance coverage, and the limited availability of adaptive equipment in the commercial market [17,23].

The models vary in structure: some operate as device libraries, allowing users to trial different options before making a definitive purchase [19], while others focus on the reuse and redistribution of donated equipment, such as the AT bank described by Pousada et al. [22]. This initiative offered a wide range of reused devices (wheelchairs, walkers, beds, etc.), with direct involvement from occupational therapists responsible for assessment, customization, and user training. Thanks to this approach, many individuals gained access to technology they could not have otherwise afforded, and device abandonment due to poor fit or misuse was reduced through professional intervention.

Similarly, the study by Hongyin et al. [21] on the functioning of a pediatric wheelchair bank in Hong Kong highlights the value of loan services. This model not only enabled the rapid provision of specialized seating systems—crucial for preventing deformities and maintaining function in children with cerebral palsy and other neuromuscular disorders—but also promoted efficient reuse of equipment. On average, each child accessed four different wheelchairs throughout their growth, allowing for continuous postural monitoring. Moreover, a 55.7% cost reduction was achieved through equipment recovery and maintenance, demonstrating the model's economic sustainability [21].

The study by Livingstone & Field [20] presents a six-month loan model of powered mobility devices for young children for testing a device, in which families were allowed to take the equipment home and use it regularly in natural environments such as the household or community. This approach allowed for the assessment of the evolution of mobility skills over an extended period and provided real opportunities for learning, play, and exploration, fostering the acquisition of motor, cognitive, and social skills in children with various functional profiles [20].

To facilitate the understanding of the different management models described in the included studies, Table 3 summarizes their key characteristics, highlighting their advantages, limitations, and representative examples.

Table 3. Comparative analysis of management models of AT loan programs.

Model	Description	Advantages	Challenges/Disadvantages
Device libraries [17,19]	Users borrow devices for short-term testing before purchasing.	Prevents device abandonment; improves person–technology matching; promotes autonomy.	Limited device availability; long waiting times; lack of consistent professional follow-up.
Reuse and redistribution programs [21–23]	Refurbishment and redistribution of donated equipment for repeated use.	Promotes circular economy and increases access to expensive equipment.	Dependence on donations; maintenance and hygiene concerns; requires trained staff.
Pediatric wheelchair banks [20]	Loan and exchange of wheelchairs adapted to children's growth stages.	Rapid access to customized seating; cost reduction up to 55.7%; continuous postural monitoring.	Requires efficient inventory and specialized staff; population specific.
Hospital-based DME reuse programs [18,24]	Recycling of unused hospital equipment through partnerships with community organizations.	Reduces medical waste and improves access for underserved populations.	Limited patient education; safety and hygiene concerns; restricted to specific institutions.

Beyond the benefit of free access, several studies indicate that these initiatives also address social barriers. For instance, they allow users to try out different devices before

making a final purchase decision, thereby preventing abandonment due to poor adaptation [18,22,24]. Several authors agree that these programs promote equity by facilitating access to technology without discrimination based on socioeconomic status or limitations in care infrastructure [18,22,24].

When analyzing the most in-demand products, there is a clear preference for those related to mobility and community participation. The reviewed literature indicates that the most frequently requested devices include the following:

- Manual and powered wheelchairs: These represent the most loaned assistive products across multiple programs. Approximately 61% of individuals participating in loan programs in their study requested some form of mobility device, with powered wheelchairs being the most in-demand [23].
- Walkers and canes: These devices are highly sought after by older adults and individuals with temporary or progressive disabilities [19,22].
- Augmentative and Alternative Communication (AAC) devices: In programs that lend aids to individuals with speech impairments—mostly children—users showed significant interest in adapted keyboards, tablets with communication software, and voice-output devices [20].
- Hospital beds and transfer support products: Adjustable beds, shower chairs, and transfer hoists are highly requested, as they promote greater independence at home and assist caregivers. Additionally, these are high-cost items and are often not covered by healthcare systems in certain regions [22,24].

3.4. Impact of Assistive Technology Loan Programs

As part of the research work, efforts were made to understand the impact that AT loan programs can have on users' quality of life and well-being. Although not all the studies reviewed address this issue directly, they do explore related factors such as the reduction in barriers to social participation, increased functional independence, the suitability of the device to the individual, emotional improvements, and the alleviation of the financial burden of accessing or trying AT for free.

When analyzing the selected studies, we can confirm that among the most relevant benefits of these programs are the promotion of autonomy, participation in community life, and improved access to devices that would otherwise be inaccessible to many families. Several studies indicate that lending devices help to facilitate mobility and the performance of daily activities without constantly relying on caregivers or family members [17,19]. The evidence also suggests that these programs are essential for expanding educational opportunities and promoting greater independence in the community setting [17]. Particularly in the case of low-tech products, such devices have been shown to allow children to participate in their environments and activities—such as eating, playing, or communicating [19]. Research findings point out that the use of adapted devices, such as special chairs or feeding utensils, fosters autonomy. Furthermore, having access to these products through a reuse service allows for a rapid response to the changes that occur at different stages of development.

Quantitative data emerging from the studies also support these positive effects. For example, one study found that the loan of an electric mobility device enabled 84.78% of the children to advance at least one level on the ALP (Assessment of Learning Powered Mobility Use) scale. Statistically significant improvements were also recorded across all tools used, with progress in understanding cause and effect, exploring the environment, directional control, and functional use of the device. These improvements translated into increased autonomy, active exploration of the environment, and reduced dependence on mobility [20]. However, the impact of loan systems goes beyond mobility. Other publications have shown that these types of services also help to prevent the improper use of devices. As documented

in their study, 31% of participants reported pain or physical harm from not having the appropriate device, highlighting the importance of these programs in preventing physical harm and promoting overall well-being [23].

Consistent findings support the idea that such initiatives allow for the immediate provision of mobility systems to promote autonomy and participation, as well as postural improvements using adapted products, thereby helping to prevent musculoskeletal deformities, maintain physiological functions, and achieve overall functional improvement. These authors also emphasize the usefulness of software that efficiently matches users with available devices, ensuring a proper match between person and assistive product [21].

In addition to these physical and functional effects, other studies have explored the emotional and psychosocial impact of using assistive devices. To this end, research conducted by Pousada et al. and Mahmood et al. [17,22] used standardized tools such as the PIADS and the Assistive Technology Device Predisposition Assessment (ATD PA) from the MPT model. In particular, the results related to the impact on QoL showed a positive but moderate impact across the three dimensions assessed: competence ($M = 0.60$), adaptability ($M = 0.56$), and self-esteem ($M = 0.49$). Factors such as age (lower impact in older adults), type of device (greater impact for communication and bathroom technologies), diagnosis (higher perceived benefit in people with NMD compared to ALS), and the match between person and technology (measured using the MPT tool) were found to significantly influence those dimensions [22].

Additionally, survey responses revealed that 72% of respondents valued the possibility of trying a device before purchasing it, while 61% highlighted cost savings as a key advantage of the service. However, some important barriers were also reported, such as a lack of awareness about the existence of these libraries (noted by 58% of participants) and long waiting times (47%). These findings underscore the potential of loan services to improve equitable access to AT [17].

3.5. Professional Involvement and the Role of Interdisciplinary Teams

The literature reviewed suggests that the involvement of interdisciplinary teams plays a crucial role—satisfaction among recipients, reducing device abandonment, and extending the devices' lifespan [22].

For example, some studies highlight the essential role of occupational therapists in ensuring that each user receives a device adapted to their physical characteristics, environment, and mobility level [22]. These professionals carried out personalized assessments and provided training in handling the equipment, which helped to prevent adaptation errors, minimized risks, and promoted safe and independent use. Additionally, early intervention by these professionals was shown to encourage continued use and enhance individuals' perceived sense of personal competence, particularly in dimensions evaluated through tools like PIADS [22].

Similar patterns were observed in other initiatives [21,22]. In both cases, professional coordination and follow-up significantly improved device adaptation, helped to prevent complications, and ensured ongoing support. Although Hongyin et al. [21] do not explicitly mention occupational therapists, they emphasize the importance of a clinical evaluation and prescription system that allows each wheelchair to be adjusted according to the postural and functional needs of children with cerebral palsy, muscular dystrophy, and other neuromuscular conditions. This professional approach enabled quick adaptations as children grew, ensuring continuity of care and avoiding complications related to poor positioning. Moreover, an efficient clinical protocol for assessment and fitting made it possible to deliver wheelchairs more quickly and accurately, which in turn helped to reduce wait times and improve the educational and community inclusion of the beneficiaries [21].

Several studies [20,24] also emphasize the crucial role of professional involvement in AT reuse programs. For example, it was reported that 91% of users in one such program received technical guidance and additional support services, which not only improved access to equipment but also reduced the risk of physical harm and significantly enhanced the participant experience [23]. Along similar lines, some sources stress the importance of having trained professionals guide the technical adaptation process using person-centered practices, to maximize the benefits of reused devices [24]. Likewise, evidence suggests that appropriate technical intervention contributes both to a better device fit and to preventing device abandonment, resulting in higher overall satisfaction with the program [20].

However, not all findings are positive. Some studies reveal a lack of knowledge among professionals, which often hinders the recommendation and/or use of assistive devices [17]. This is especially evident in the field of intellectual disabilities, where families frequently report a lack of information and guidance [17]. A similar issue was highlighted in one study [24], where 59% (n = 151) of care providers admitted to being unaware of assistive device reuse programs. The study also found that individuals are rarely informed about reuse programs by their clinical teams. These findings underscore another reality: the pressing need to train professionals in sustainable practices and to provide recipients with ongoing support and guidance [24].

4. Discussion

The purpose of this systematic review was to examine the impact of support product loan banks in society, as well as to identify the management models, strategies, and professionals involved in this practice.

The findings obtained show that this type of service provides functional, psychosocial and economic benefits, especially when accompanied by specialized professionals. Unlike previous reviews focused on AT in general terms [13,15,26,27], the present study focuses exclusively on free loan programs, which constitutes an additional contribution to the existing production. To this end, management models, most requested devices, access barriers and implementation strategies were identified, providing relevant evidence for professionals, policy makers, and service managers. However, it is important to note that the current literary production in this area is scarce and methodologically diverse, which restricts the generalizability of the results.

Although the positive impacts, in psychosocial and functional terms, are evident, several studies report significant barriers in access to these devices [13,28,29]. Among the main limitations are structural barriers, such as a lack of information, poor coverage by health systems, social stigma, and the absence of legislation and institutional support [13,28,29]. These findings are congruent with global observations made by WHO over the past decades, which highlights persistent inequalities in access to AT worldwide [2,29].

In response to these needs, several countries have developed initiatives led by organizations, associations or similar, aimed at the free provision of support products [9,10,30–33]. These types of initiatives attempt to respond to needs not covered by health systems or medical insurance, guaranteeing equitable access, reducing socioeconomic and geographic gaps, and minimizing the abandonment or inadequate use of devices.

4.1. Interpretation of the Evidence Reviewed

In interpreting the results, it is important to consider that the studies included cover a long period of time (from 2004 to 2024) [17–24]. This breadth reflects the technological, social, and regulatory changes that assistive products have undergone in recent decades. The devices available, the public policies in place, life expectancy, and the inclusion of

people with disabilities, as well as assessment tools, have evolved considerably, which affects comparability between studies and, therefore, the interpretation of the results. An illustrative example is the progressive incorporation of standardized instruments such as PIADS, QUEST, or the MPT model [20,22], which were absent in older research. Likewise, the products with the greatest presence in older studies are based on basic products such as dialyzers, manual wheelchairs, or general mobility aids [18,21], while more recent studies are beginning to talk about more complex and adaptive technologies, such as AAC devices, adjustable beds, environmental control systems, and user-centered functional assessment tools [17,19,20,22–24].

Regarding the benefits of these resources, although there are different approaches, several investigations have shown significant benefits. In this context, recent research has focused on the assessment of quality of life using the PIADS scale, user satisfaction using the QUEST scale, and needs analysis using the rATA tool. For example, the use of the PIADS scale has identified a moderate positive impact on the dimensions of competence (mean: 0.77), adaptability (0.62) and self-esteem (0.53), suggesting that support products contribute to personal well-being, especially in terms of independence, functionality, and adaptation to situations of dependence or aging [34]. In relation to the application of the rATA tool, the needs, use, and barriers to accessing AT were assessed in a representative sample of the population in India. The results indicated that 31.8% of participants had at least one functional impairment, with the most common impairments related to vision (26.6%) and mobility (11.9%). The estimated prevalence of need for AT was 24.5%, while actual use was 19.9%. The most used products were those related to vision, followed by mobility devices and orthoses. In terms of access, many users acquired their devices through direct expenditure (67.4%), and only a small percentage accessed them through the public system (4.9%). Among the main barriers identified were cost, lack of support, social stigma, and limited availability of suitable products [35].

In this analysis, it is also worth noting that professional support has emerged as a key element for the success of these programs. The participation of interdisciplinary teams, and in particular occupational therapists, has been shown to significantly improve the effectiveness, safety, and sustainability of interventions [10,21–23]. These professionals not only evaluate the suitability of the device, but also guarantee adequate, personalized, and functional use, avoiding complications derived from poor adaptation and promoting autonomy and social participation. The case documented by Walket et al. [10] highlights the central role of the occupational therapist as the professional in charge of assessing the suitability of the devices, promoting the independence and community participation of the users, as well as the sustainability of the program. This indicates that having professionals involved in the selection and adaptation of the devices is fundamental to make the most of the available resources. Consequently, we can say that the effectiveness of these programs is determined not only by their design, but also by the quality of the technical support provided.

4.2. Implications for Practice

The dissemination of these initiatives is essential for their replicability in other contexts, as it highlights the role of this type of resource. Although the purpose of this review has been to learn about the existence and impact of support product banks, it is inevitable to mention current concerns about the accessibility of support products.

As public agencies and global reports have been reflecting for years, access to AT is a fundamental human right and an essential component of universal health coverage, as established by the Convention on the Rights of Persons with Disabilities and the 2030 Agenda for Sustainable Development [36]. However, most people who need assistive

products do not access them, especially in low- and middle-income countries, which generates structural inequalities that affect autonomy, social inclusion, and quality of life. Given such a scenario, free AT loan programs, such as those analyzed in this review, represent an effective response to the lack of public coverage. However, their sustainability depends on the existence of public policies that guarantee stable funding [17]. Therefore, we consider it essential to generate empirical evidence on the impact of reuse and loan programs, which not only strengthens public policy decision-making, but also represents a significant step towards compliance with international commitments on disability and assistive technologies [37].

After analyzing the results, it was found that one of the main challenges facing these programs is their structure and financial sustainability, since in many cases they depend on donations or subsidies, which limits their continuity and scope. Added to this is the challenge of technical maintenance of equipment and professionals, which requires constant investment in infrastructure and trained personnel. The experience of initiatives such as Paragad's AT reuse program, in collaboration with the University of Washington, highlights the importance of a coordinated strategy that integrates logistics, clinical evaluation, and administrative planning [10]. These programs are strengthened by structured processes for the receipt, disinfection, repair, and redistribution of devices, as well as the involvement of professionals such as occupational therapists, which ensure safe and functional adaptation to users' needs.

Sustainability can also be enhanced through mixed financing models, such as combining token user contributions with billable repair services, thus promoting both beneficiary autonomy and program self-sufficiency. To this end, device reuse, repair, and recycling programs can be presented as a key strategy to promote sustainability and the circular economy.

The role of the state is key to consolidate and expand these initiatives, as established by the Convention on the Rights of Persons with Disabilities [36] and reinforced by the WHO Global Report on Assistive Technology [2]. Greater public investment and inclusive policies are required to ensure their continuity. To this end, it is proposed to establish specific budget lines to finance loan banks and the reuse of technical aids; create a legal framework to regulate and facilitate collaboration between health, social development and other key areas; implement direct support mechanisms for local institutions, associations and hospitals to strengthen their infrastructure and operational capacity; or promote public-private cooperation agreements to expand available resources and territorial coverage.

In this regard, the recommendations of the Global Report on Assistive Technology [38] are particularly relevant, as they advocate comprehensive delivery systems, updated data, standardized tools, and a perspective focused on equity, sustainability, and the active participation of users.

Finally, it should be added that, although the data gathered in this review may not be entirely conclusive, the analysis provided key points on the benefits of this type of resource. In such a way, it offers and orients towards future management models that can favor the objectives of sustainable development, particularly with objectives 3 and 10 [6,8], which aim to promote health, well-being, and a reduction in inequality.

4.3. Limitations and Strengths of the Study

The number of studies included in the review ($n = 8$) is the main limitation of this research. The scarcity of scientific production highlights the lack of research in this area, which makes it difficult to analyze its impact. The methodological quality of several of these studies was limited, with low JBI scores. This was mainly due to a lack of control for confounding factors, incomplete descriptions, and weak statistical analyses, which

may have caused biases and decreased the reliability of the results. In addition, it should also be considered that the number of participants per study varies greatly (from 18 to 1234 participants), which makes it difficult to compare results. Without controlling for confounding factors, improvements in autonomy or quality of life cannot be attributed with certainty to assistive technology lending programs alone. Thus, although the results appear positive, they should be interpreted with caution and stronger evidence is needed.

Secondly, methodological heterogeneity was observed both in the study populations and in the evaluation tools used. Additionally, although some studies employed validated instruments such as the PIADS scale or the MPT model, many others relied on ad hoc questionnaires or unstructured interviews, which may affect the validity and reliability of the results. Moreover, several studies did not report key sociodemographic data of the participants (age, sex, type of disability), limiting subgroup analyses and the understanding of the differential impact of programs based on individual characteristics. We did not perform a meta-analysis in this review due to data heterogeneity, which further limits the possibility of quantitatively synthesizing the results across studies.

Furthermore, one of the challenges encountered during this review was the difficulty in identifying studies due to the absence of a standardized keyword that accurately defines assistive technology lending services. The diverse terminology used in the literature to refer to such initiatives (for example, loan programs, assistive technology lending libraries, and equipment loan banks, among others) hinders the systematic identification of relevant research.

Finally, it is important to note that differences between the health system models of each country influence the contextual characteristics of the topic under study.

One of the key strengths of this review is that it represents the first of its kind, as no prior reviews on this specific topic were identified in the literature. The study employed a comprehensive search strategy, drawing from multiple databases including Medline, Web of Science, and Scopus, as well as reference lists. Rigorous selection criteria were applied, and the review was conducted in accordance with PRISMA guidelines. Importantly, the findings were analyzed across variables such as type of study, purpose, participants, assessment tools, type of assistive technology, study variables related to the quality of life, evidence on the impact of free AT, and implications for practice and were contextualized using the relevant literature published to date.

5. Conclusions

The main conclusions derived from this study are as follows:

- AT loan and reuse banks represent an effective resource to improve equitable access to assistive devices, especially in contexts where public or health insurance systems do not cover all the needs of the population.
- The findings confirm a positive impact on individuals' autonomy, functionality, and social participation. A positive effect is also observed on emotional well-being when the devices are properly adapted to individual needs.
- The effectiveness of these programs depends on professional support, which ensures proper assessment, prescription, and follow-up. Therefore, they should be understood not merely as lending systems, but as professionalized services that ensure proper functioning and impact.
- Greater public investment and inclusive policies are required to ensure the continuity of these services. It is essential to strengthen institutional support and inclusive policies to consolidate these services, guarantee their long-term sustainability, and expand their coverage to those who need them most.

Finally, more rigorous and consistent scientific production is needed, using validated tools and providing comparable data to evaluate the impact of these programs.

Supplementary Materials: The following supporting information can be downloaded at <https://www.mdpi.com/article/10.3390/app15168809/s1>, Table S1. Reasons for the exclusion of full-text articles based on the application of inclusion criteria ($n = 10$) [10,12,15,39–45].

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Abbreviations

Abbreviation	Definition
AAC	Augmentative and Alternative Communication
ALP	Assessment of Learning Power
ALS	Amyotrophic Lateral Sclerosis
AT	Assistive Technology
ATD PA	Assistive Technology Device Predisposition Assessment
CFCS	Communication Function Classification System
CP	Cerebral Palsy
DMD	Duchenne Muscular Dystrophy
DME	Durable Medical Equipment
GMFCS	Gross Motor Function Classification System
ISO	International Organization for Standardization
LSS	Level of Sitting Scale
MACS	Manual Ability Classification System
MPT	Matching Person and Technology
NMDs	Neuromuscular Diseases
n	Number of Participants (sample size)
PARTS/M	Participation and Mobility Survey
PIADS	Psychosocial Impact of Assistive Devices Scale
PMP	Power Mobility Program
QoL	Quality of Life
QUEST	Quebec User Evaluation of Satisfaction with Assistive Technologies
rATA	Rapid Assistive Technology Assessment Tool
SB	Spina Bifida
SD	Standard Deviation
SMA	Spinal Muscular Atrophy
WHO	World Health Organization

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