Implementation of virtual reality for neurodivergent individuals: perspectives of disability care staff

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Abstract

Purpose – *Despite growing evidence of virtual reality (VR) benefits for neurodivergent individuals, its adoption by disability support organizations remains limited. This study aimed to understand the perspectives of disability service staff on the benefits, barriers and practical needs for integrating VR into services.*

Design/methodology/approach – *A survey of 41 disability service staff members across Australia, the United Kingdom and the United States of America gathered quantitative and qualitative data on their views regarding VR adoption, including perceived benefits, challenges and training needs.*

Findings – *Results revealed widespread optimism about VR's potential benefits, yet highlighted notable barriers to adoption, including financial constraints, ethical concerns and gaps in knowledge about VR's application. Crucially, the study emphasizes the need for education on VR, further evidence of its effectiveness and the importance of addressing ethical and safety issues to foster broader adoption.*

Research limitations/implications – *Integrating VR in disability services may enhance support for neurodivergent individuals by fostering skill training, social inclusion and personalized care. Addressing adoption barriers could potentially support the development of innovative and accessible service delivery.*

Originality/value – *This study explores VR adoption in disability services by capturing insights from diverse staff roles across multiple countries. It provides an understanding of the barriers and facilitators to VR integration from both clinical and non-clinical perspectives. The five proposed recommendations – strengthening evidence, addressing resource constraints, building implementation capacity, establishing safety and ethical frameworks and fostering sustainable adoption – address the specific barriers identified. These recommendations are aimed at guiding efforts to enhance support for neurodivergent individuals through VR applications.*

Keywords *Neurodivergence, Virtual reality, Implementation, Disability service staff*

Paper type *Research paper*

Received 12 September 2024
Revised 18 January 2025
Accepted 19 May 2025

Disclosure statement: The authors report there are no competing interests to declare.

Data availability statement: The data presented in this study are available on request from the corresponding author.

Introduction

Assistive technologies support inclusion, independence, social interaction, and learning for individuals with intellectual disabilities and neurodivergent populations (Adolfsson *et al.*, 2016; Lancioni *et al.*, 2020; Pontikas *et al.*, 2022). The concept of neurodiversity frames neurological differences as natural variations rather than deficits, offering a strength-based perspective that encompasses conditions such as autism, attention-deficit/hyperactivity disorder (ADHD), and learning differences (Doyle, 2020). Intellectual disability frequently co-occurs with these conditions (American Psychiatric Association, 2013), presenting complex needs that require individualized and adaptable support. Advances in assistive technologies are expanding possibilities for tailored interventions, with Virtual Reality (VR) offering unique approaches to learning and support.

VR's appeal lies in its ability to create highly engaging, interactive experiences within simulated three-dimensional environments (Burdea and Coiffet, 2003; Sherman and Craig, 2018). While VR can be implemented in various ways, this research focuses on immersive VR using head-mounted displays (HMDs), where users interact with computer-generated environments that closely mimic real-world experiences. This high degree of realism and interactivity fosters a profound sense of presence within the virtual space, enabling applications from entertainment to education and training (Sherman and Craig, 2018).

The immersive nature of VR allows neurodivergent individuals to learn and develop skills in safe, customizable and controlled simulated environments (Dixon *et al*., 2020; Michalski *et al*., 2021; Tan *et al*., 2022). These adaptable environments allow for tailored learning experiences, fostering confidence and skill refinement in scenarios that may be impractical, costly, or risky to practice in real life (Newbutt *et al*., 2016; Sherman and Craig, 2018). Specifically, VR can facilitate the acquisition of real-world skills by providing repeated exposure and practice in a low-stakes environment (Franze *et al*., 2024; Michalski *et al*., 2023). Moreover, VR has shown promise in supporting communication interventions (Bailey *et al*., 2022), teaching social skills (Montoya-Rodríguez *et al*., 2023; Mosher *et al*., 2022), helping in managing anxiety (Mills *et al*., 2023) and enriching educational experiences (Newbutt *et al*., 2020). Furthermore, VR may also serve as a tool for staff training to better support neurodivergent individuals (Hsu *et al*., 2024).

Despite a growing body of evidence supporting its use for neurodivergent individuals (Carnett *et al*., 2023) and technological advances that have made VR more accessible and affordable (Bell *et al*., 2020; Loetscher *et al*., 2023), the use of VR in disability support remains limited. A better understanding of the reasons behind the delayed adoption is crucial for accelerating the implementation of VR in disability support settings.

Several key barriers identified in studies of VR implementation in mental health and rehabilitation are likely hindering its adoption in disability support organizations as well. For example, clinicians in these fields often encounter obstacles such as lack of knowledge about VR technologies, limited time for training, and a shortage of technical support (Brassel *et al*., 2021; Kouijzer *et al*., 2023; Pandey and Vaughn, 2021; Sarkar *et al*., 2021). A recent survey reinforces these findings, showing limited VR adoption among school professionals working with children with disabilities, with non-users citing a lack of training, knowledge, and financial resources (Yakubova *et al*., 2022). Conversely, the presence of comprehensive knowledge, dedicated training programs, and robust technical support have been identified as critical facilitators of successful VR adoption (Chung *et al*., 2022; Kouijzer *et al*., 2023).

While findings from mental health, education and rehabilitation settings provide valuable insights into potential VR adoption barriers, disability support organizations operate in a distinct context. They typically function under different funding models, service delivery approaches, and organizational structures, with disability services often relying on government funding and community-based support models. Such contextual differences necessitate targeted research on VR implementation within disability support settings.

Research addressing VR implementation in disability support organizations remains scarce. Existing studies on assistive technologies in disability services typically omit VR entirely or address it only peripherally (e.g. Rasouli *et al*., 2023). While the few studies on VR in disability have established the importance of VR knowledge and perceived utility for adoption (Balasuriya *et al*., 2022; Lotan *et al*., 2011), they predominantly offer qualitative insights from a limited range of staff perspectives. There is a notable absence of quantitative research exploring the perspectives of clinical roles (e.g. support workers, occupational therapists, etc.) and non-clinical stakeholders (e.g. managers, CEOs, etc.). Research incorporating a broader range of stakeholders would provide a more comprehensive understanding of the factors influencing VR adoption and inform more effective implementation strategies.

Objectives

The primary objective of this study was to explore disability service staff perspectives regarding the implementation of VR for neurodivergent people within disability support organizations and to answer the following questions: (1) What is the knowledge and impression of disability service staff regarding VR use for neurodivergent individuals?; (2) What are the perceived benefits and drawbacks of VR use for neurodivergent individuals, as identified by the staff?; (3) What barriers and facilitators exist in the implementation of VR for neurodivergent people, as reported by these staff members?; and (4) Are there differences in the responses to the above questions between clinicians and non-clinicians?

Methods

Participants and procedure

The study recruited participants from July to September 2023 using two methods: (1) paid social media advertisements (Facebook, Instagram, Messenger) with an AUD $250 budget; and (2) email invitations sent to disability support organizations through professional networks. Eligible participants were adults (≥18 years) employed by disability organizations working with neurodivergent individuals. There were no additional inclusion or exclusion criteria. The survey was conducted online in English via Qualtrics, where participants also provided informed written consent. Ethics approval was granted by the Human Research Ethic Committee of the University of South Australia (Project number 205580).

Measures

Survey development and structure. In developing the survey, 64 items were initially created based on a literature review of VR implementation factors and the “individuals involved” domain of the Consolidated Framework for Implementation Research (CFIR, Damschroder *et al.*, 2022). The items spanned seven key themes: (1) Demographics (2) Knowledge and Impressions of VR (3) Benefits to VR Use (4) Drawbacks to VR Use (5) Barriers to Implementation (6) Facilitators of Implementation and (7) Safety Considerations. The survey items underwent refinement through expert review and pilot testing with staff from disability organizations, resulting in a final survey of 34 items (see supplementary materials). This survey combined closed-ended (Likert scales, multiple-choice) and open-ended questions.

Survey sections. **Demographics**. This section gathered basic demographic information (age, gender, country), professional background (occupation, years in role, contact with neurodivergent individuals), familiarity with VR and whether they used it with neurodivergent individuals.

Knowledge and Impressions of VR. Comprising four questions adapted from Chung *et al.* (2022), this section evaluated participants’ self-reported technological savviness, knowledge of VR, and impressions of VR and VR for neurodivergence on a 7-point Likert scale, where higher scores indicated greater proficiency, knowledge, or more positive impressions. Optional short answer questions provided additional insights into participants’ views on VR and VR for neurodivergence.

Benefits to VR Use. This section evaluated participants’ perceptions of VR’s benefits for neurodivergent individuals through six questions, informed by Kouijzer *et al.*’s (2023) review. Items like “VR can help individuals learn and practice real-world skills” were rated on a 7-point Likert (1 = Strongly disagree, 4 = Neither agree nor disagree, 7 = Strongly agree), where scores above the neutral point (4) indicated endorsement of potential benefits.

Drawbacks to VR Use. This section assessed the perceived drawbacks of VR for neurodivergence with six questions, also based on Kouijzer *et al.*’s (2023) review. Items like “VR could be stress-inducing” were also rated on the same 7-point scale (1 = Strongly disagree, 4 = Neither agree nor disagree, 7 = Strongly agree), with scores above the neutral points indicating recognition of potential concerns.

Barriers to Implementation. This section, comprising eight questions, explored staff perceptions of barriers to implementing VR in disability organizations for neurodivergent individuals. Informed by Chung *et al*. (2022) and Kouijzer *et al*. (2023), items like "challenges in integrating VR with existing technology" were rated on a 7-point Likert scale (1 = Strongly disagree, 4 = Neither agree nor disagree, 7 = Strongly agree), where scores above the neutral point (4) indicated recognition of potential barriers. An open-ended question allowed for additional insights beyond the fixed-response items.

Facilitators to Implementation. This section assessed perceived facilitators for VR implementation in disability organizations, featuring nine questions informed by the CFIR (Damschroder *et al*., 2022) and Chung *et al*. (2022) and Kouijzer *et al*. (2023). Questions, such as the importance of VR knowledge, were rated similarly on a 7-point scale (1 = Strongly disagree, 4 = Neither agree nor disagree, 7 = Strongly agree), where scores above the neutral point (4) indicated endorsement of potential facilitators. An open-ended question provided space for further feedback on facilitators for VR implementation.

Safety Considerations. This section focused on understanding participants' views on safety in VR implementation within disability organizations. It included a single question, rated on a 7-point Likert scale, regarding the importance of having clear guidelines and standards for ethical and inclusive VR use. Higher scores reflected a greater emphasis on the importance of these safety guidelines and standards in disability organizations.

Data analyses

Quantitative analysis was conducted using jamovi (The jamovi project, 2024). We used non-parametric one-sample Wilcoxon signed-rank tests to compare responses against the neutral midpoint of the Likert scales (e.g. 4 on a scale ranging from 1 to 7), as our data was ordinal in nature and tests indicated violations of normality assumptions. Importantly, the same pattern of significant results was found when using parametric tests (one-sample *t*-tests). For comparing responses between clinical and non-clinical staff, we used Mann-Whitney *U* tests.

We conducted content analysis using an inductive approach for qualitative data from open-ended survey responses. Responses were systematically reviewed to identify recurring themes and patterns, and representative quotes were selected to illustrate these themes. This analysis was conducted to complement and contextualize our quantitative findings.

As the final sample size was determined by the number of participants who completed the survey during our recruitment period, we conducted a sensitivity analysis using G*Power (Faul *et al*., 2007). Specifically, we used the "means: difference from constant (one sample case)" test with two tails, an alpha of 0.05, and power of 0.80 to determine the minimum effect size our study could reliably detect.

Results

From the 60 participants who accessed the survey, we excluded those with incomplete responses (less than 50% completed, $n = 16$) or not working with neurodivergent individuals ($n = 3$). In total, 41 participants were included in the analysis. On average, the 32 females and 9 males were 36.3 (SD = 11.41) years old and had 11.6 years (SD = 10.90) of experience in disability care for neurodivergence. The group comprised 25 clinicians and 16 non-clinicians. All of them had heard of VR, 68.3% had used VR, and 22% had used it specifically with neurodivergent individuals. A sensitivity analysis showed that with a sample size of 41, we were able to detect medium-sized effects ($d > 0.44$) when comparing responses against the neutral midpoint of the Likert scales. Detailed demographic and work characteristics are shown in Table 1. The average survey completion time was 20.8 min.

Table 1 Demographic, work characteristics and virtual reality (VR) usage and applications

	Clinical (n = *25*) n *(%)*	*Non-clinical* (n = *16*) n (%)	*Full sample* (N = *41*) n *(%)*
Gender			
Female	21 (84)	11 (69)	32 (78)
Male	4 (16)	5 (31)	9 (22)
Country			
Australia	22 (88)	11 (69)	33 (81))
UK	1 (4)		1 (2)
US	2 (8)	5 (31)	7 (17)
Occupation			
Social Worker	3 (12)		3 (7)
Developmental Educator	13 (52)		13 (32)
Support Worker	2 (8)		2 (5)
Occupational Therapist	1 (4)		1 (2)
Behavioral Therapist	3 (12)		3 (7)
Psychologist	1 (4)		1 (2)
Administration		2 (13)	2 (5)
Regional Manager		3 (19)	3 (7)
Operations Manager		2 (13)	2 (5)
Project Manager		2 (13)	2 (5)
Executive Director		3 (19)	3 (7)
CEO		4 (25)	4 (10)
Other	2 (8)	1 (6)	2 (5)
Types of contact with clients			
Mainly Individual	18 (72)	7 (44)	25 (61)
Mainly Group	1 (4)		1 (2)
Combination of Group and Individual	6 (24)	9 (56)	15 (37)
Heard of VR[a]	25 (100)	16 (100)	41 (100)
Used VR			
Yes	16 (64)	12 (75)	28 (68)
No	9 (36)	4 (25)	13 (32)
Where VR was used			
At home	5 (31)	4 (33)	9 (32)
At a friend or family house	2 (13)	3 (25)	5 (18)
At a commercial games outlet	5 (31)	2 (17)	7 (25)
At work	3 (19)	2 (17)	5 (18)
At an event	1 (6)	1 (8)	2 (7)
VR use with neurodivergent clients			
Yes	4 (16)	5 (31)	9 (22)
No	21 (84)	11 (69)	32 (78)
Types of VR use with neurodivergent individuals			
Life-skills Training	2 (11)	2 (17)	4 (13)
Communication and Social Skills	2 (11)	2 (17)	4 (13)
Vocational and Job training	2 (11)	1 (8)	3 (10)
Rehabilitation/physical Therapy	2 (11)	1 (8)	3 (10)
Sensory integration and simulation	3 (16)	1 (8)	4 (13)
Cognitive Training	2 (11)	2 (17)	4 (13)
Clinical Assessment and Diagnosis	2 (11)	1 (8)	3 (10)
Recreation and Leisure	4 (21)	2 (17)	6 (19)

Note(s): Percentages are calculated per question, presented by occupation (Clinical, Non-Clinical) and combined totals. Multiple selections were possible for the location of VR use
Source(s): Authors' work

RQ1. What are disability service staff's knowledge and impressions of VR use for neurodivergent individuals?

Table 2 presents the outcomes of the One-Sample Wilcoxon Tests, where the tech savviness, VR knowledge, and impressions of VR among participants were examined against the neutral midpoint of 4 on a 7-point Likert scale. The results showed that participants' self-rated tech savviness and their impressions of VR, both generally and for neurodivergence, significantly exceeded the midpoint (Median = 5, $p < 0.01$), indicating higher than average tech proficiency and positive views towards VR. Conversely, their ratings for VR knowledge did not significantly differ from the neutral midpoint (Median = 4, $p = 0.353$), suggesting a moderate level of knowledge about VR.

The quantitative data is enriched by qualitative comments revealing a general enthusiasm towards VR, albeit with limited understanding. Quotes like "I am excited by the possibility of it and 'Read articles on using VR for exposure therapies, seems promising,' indicate a general positivity towards VR. However, remarks such as 'I haven't had much experience with it'," "I don't know much about it outside of gaming usage", and "I don't know how it would be used", highlight a gap in comprehensive VR knowledge. These statements align with the moderate knowledge levels indicated by the quantitative results.

RQ2. What are the key perceived benefits and drawbacks identified by disability service staff for the use of VR for neurodivergent individuals?

Participants' perceptions of VR benefits and drawbacks for neurodivergence are shown in Table 3. Most items significantly diverged from the neutral midpoint ($p < 0.05$), indicating strong agreement. Notable benefits identified include VR's potential to benefit individuals and offer unique experiences in comparison to other methods of care. Key drawbacks were concerns about potential accidents, injuries, and distrust from neurodivergent groups towards its use. The two items with no clear agreement or disagreement ($p > 0.05$) were "VR could increase feelings of loneliness" and "VR could be stress-inducing".

The qualitative data complement these findings by highlighting participants' recognition of VR's therapeutic value and potential to offer unique experiences. Comments such as "VR can help individuals learn and practice real-world skills" and "It's a fantastic experiential and educational tool." emphasize this perspective. However, alongside these positive views were concerns about VR's risks, such as discomfort and disorientation, with one participant noting, "The models I've tried lacked haptic feedback, and were still quite sickening and disorientating." Additionally, the apprehension about acceptance among users was evident in remarks like, "I don't think the people I work with would like having something placed on their head; I also feel they would probably find it scary and not understand what was going on" and "Difficulty understanding technology, concerns of how will affect cognition and propensity for taking away social contact."

Table 2 Tech savviness, virtual reality knowledge and impressions of virtual reality

	n	Mdn	SD	*W*	p	R_{rb}
Tech Savviness	41	5	1.1	544	<0.001*	0.94
Virtual Reality Knowledge Rating	41	4	1.39	108	0.353	−0.22
Impression of Virtual Reality	41	5	1.17	420	<0.001*	0.93
Impression of Virtual Reality (neurodivergence)	41	5	1.28	453	<0.001*	0.95

Note(s): Two-tailed Wilcoxon one-sample test against the neutral point (4) on 7-point Likert scales. Scale anchors varied by question: tech-savviness (1 = Strongly disagree, 7 = Strongly agree), VR knowledge (1 = No knowledge, 7 = Expert knowledge), and VR impression (1 = Strongly negative, 7 = Strongly positive). Scores significantly higher than 4 indicate higher levels of the measured attribute
* = significant at < 0.05 level. Mdn = Median, SD = Standard deviation, p = statistical significance.
R_{rb} = rank biserial correlations
Source(s): Author's work

Table 3 Benefits and drawbacks of VR use by neurodivergent individuals

		Mdn	SD	*W*	p	R_{rb}
Benefits	VR has the potential to benefit individuals	6	6	666	<0.001*	1
	VR can offer unique experiences in comparison to other methods of care	6	5.74	659	<0.001*	0.98
	VR can help individuals learn and practice real world skills	6	5.76	584	<0.001*	0.96
	VR can create safe and controlled environments	6.5	6.06	586	<0.001*	0.97
	VR can create realistic and immersive experiences	6	5.92	612	<0.001*	0.94
	VR can improve engagement and motivation	6	5.59	567	<0.001*	0.90
Drawbacks						
	VR could increase accidents or injuries	5	5.37	491	<0.001*	0.86
	and neurodivergent Individuals would distrust its use	5	5.13	495	<0.001*	0.77
	VR could be disorienting	5	4.77	325	0.005*	0.60
	VR is too expensive	5	4.64	283	0.021*	0.50
	VR could be stress inducing	4	3.88	163	0.756	−0.07
	VR could increase feelings of loneliness	4	4.03	110	0.88	0.04

Note(s): Two-tailed Wilcoxon one-sample test against the neutral point (4) on a 7-point Likert scale (1 = Strongly disagree, 7 = Strongly agree). For Benefits items, scores significantly higher than 4 indicate endorsement of potential benefits. For Drawbacks items, scores significantly higher than 4 indicate recognition of potential concerns
* = significant at <0.05 level. Mdn = Median, SD = Standard deviation, *p* = statistical significance.
R_{rb} = rank biserial correlations
Items were ranked in descending order of highest to lowest rank biserial correlation scores
Source(s): Author's work

RQ3. What are the key perceived barriers and facilitators identified by disability service staff for implementing VR in disability organizations for neurodivergent individuals?

The foremost barriers identified were a lack of financial resources, insufficient staff resources, and the need for technical expertise. Conversely, the leading facilitators were research supporting VR's effectiveness, knowledge about VR's capabilities, user-friendly interfaces, and compatibility with client needs. However, staff showed a neutral stance regarding general concerns about adopting VR in disability organizations (see Table 4).

Participants indicated a significant knowledge and understanding gap as a barrier in the qualitative responses, highlighted by remarks such as "I can see a lot of providers using VR in the future but not actually understanding the usage, skills behind it." Ethical and safe use emerged as another concern, with participants wary of potential misuse and overuse. This was illustrated by comments like, "There needs to be in-depth ethical research into the use of VR within supports to ensure it is used appropriately and is suitable for each participant." The facilitation of VR implementation was seen to hinge on adequate training and professional qualifications, emphasized in comments about the need for specific training. Some participants thought that VR would be more successful if disability workers required "a specific qualification to offer VR therapy". Participants also pointed out the importance of informed and well-supported VR practices. This perspective was supported by calls for additional studies demonstrating VR's therapeutic value and adequate staff training.

RQ4. Are there differences between clinicians and non-clinicians?

Mann-Whitney *U* tests compared clinicians and non-clinicians on their knowledge and perceptions of VR's benefits, drawbacks, barriers, and facilitators. The analysis revealed only one significant difference: non-clinicians exhibited higher concerns about adopting VR in disability organizations than clinicians (Median non-clinicians = 4, SD = 1.93; Median clinicians = 4,

Table 4 Barriers and facilitators of implementation

		Mdn	SD	W	p	R_{rb}
Barriers	Lack of financial resources for VR	6	1.20	629	<0.001*	0.89
	Insufficient staff resources for VR implementation	6	1.30	674	<0.001*	0.82
	Technical expertise required for effective use of VR	5	1.33	508	<0.001*	0.81
	Limited time available to learn and use VR	5	1.26	580	<0.001*	0.74
	Difficulty and complexity in using VR	5	1.43	444	0.003*	0.58
	Challenges in integrating VR with existing technology	5	1.40	473	0.023*	0.42
	Concerns about adopting VR in disability organizations	4	1.70	152	0.368	−0.20
Facilitators	Research that shows VR is effective	6	0.92	741	<0.001*	1
	Knowledge about what VR can do	7	0.96	856	<0.001*	0.99
	Easy-to-use VR interfaces and controls	6	0.97	816	<0.001*	0.99
	Compatibility with client needs and preferences	7	0.95	817	<0.001*	0.99
	Having IT support with technical issues	6	1.08	804	<0.001*	0.96
	Having adequate infrastructure (e.g. space, power, connectivity)	6	1.05	805	<0.001*	0.96
	VR works well with existing programs and services	5	1.59	666	<0.001*	0.71
	VR implementation is important to implement	5	1.47	399	<0.001*	0.71

Note(s): Two-tailed Wilcoxon one-sample test against the neutral point (4) on a 7-point Likert scale (1 = Strongly disagree, 7 = Strongly agree). For Barriers items, scores significantly higher than 4 indicate recognition of potential barriers. For Facilitators items, scores significantly higher than 4 indicate endorsement of potential facilitators.
* = significant at <0.05 level. Mdn = Median, SD = Standard deviation, p = statistical significance.
R_{rb} = rank biserial correlations
Source(s): Author's work

SD = 1.56; U = 135, p = 0.022, rank biserial correlations = 0.33). All other aspects showed no significant differences between the two groups regarding VR implementation.

Discussion

The present study explored disability support staff perspectives regarding VR implementation for neurodivergent individuals. Our findings revealed that while staff hold positive impressions of VR and recognize its potential benefits, major barriers include insufficient financial and staffing resources. Staff identified education about VR applications and evidence of effectiveness as key enablers for broader adoption while expressing important concerns about ethical and safety issues.

Regarding staff knowledge and impressions of VR (RQ1), our findings demonstrated that all staff were aware of VR, with two-thirds of staff reporting personal VR experience, yet only 22% had used it with neurodivergent clients. The low implementation rate aligns with previous reports showing that VR remains underutilized in disability organizations (Balasuriya *et al*., 2022; Rasouli *et al*., 2023). The notable gap between personal VR experience (68%) and professional use (22%) demonstrates that familiarity with VR technology is insufficient to drive implementation in clinical practice.

Encouragingly, staff demonstrated predominantly positive attitudes toward VR, particularly regarding its potential for skill development and learning opportunities. This finding is important as research has consistently shown that staff are more likely to engage with new technologies when they recognize clear benefits for their clients (Lindner *et al*., 2019; Mills *et al*., 2024; Yakubova *et al*., 2022).

In examining VR use's perceived benefits and drawbacks (RQ2), our findings revealed clear patterns in disability support staff perspectives. Staff strongly endorsed VR's potential to benefit neurodivergent individuals, particularly emphasizing its unique experiential and educational value compared to traditional care approaches. This positive outlook was reflected in staff comments highlighting VR's potential for real-world skill practice and its value as an educational tool.

However, staff also identified several significant concerns that need addressing for successful implementation. Primary concerns centered on physical safety risks and the potential for distrust or resistance from neurodivergent individuals toward VR use. Staff specifically expressed concerns about managing risks such as accidents, disorientation, and cybersickness when using VR with neurodivergent individuals. While general VR safety guidelines exist (Meta, 2023), our findings indicate that staff could benefit from disability-specific training protocols that address their unique client needs.

The ambivalence expressed regarding VR's potential impact on loneliness and stress levels suggests these areas require particular attention in future implementation efforts. Staff observations about acceptance challenges, particularly regarding the physical interface of VR headsets and technology comprehension, point to the importance of carefully considered introduction and adaptation strategies for neurodivergent users. These implementation concerns echo broader findings in assistive technology research about the importance of user-centered design and careful consideration of individual needs (Herrera *et al*., 2024; Newbutt *et al*., 2024).

The study revealed several significant barriers and facilitators affecting VR implementation (RQ3). The primary barriers identified were insufficient financial and staffing resources, along with a significant knowledge and expertise gap. Staff expressed particular concern about practitioners potentially using VR without an adequate understanding of its applications and technical requirements. The need for ethical implementation emerged as an additional barrier, with staff emphasizing the importance of in-depth research to ensure appropriate and suitable use. These concerns align with recent calls for tailored ethical frameworks in XR research with neurodivergent populations, which highlight issues around accessibility, privacy, security, sensory overload, and psychological well-being (Newbutt and Bradley, 2025).

The identified barriers broadly align with broader healthcare technology adoption research (Chung *et al*., 2022; Kouijzer *et al*., 2023), which consistently identifies similar barriers, especially regarding resource limitations. Our findings suggest that successful VR implementation will require organizations to develop sustainable funding models and consider ways to integrate VR training within existing staff workloads.

Regarding facilitators, staff highlighted several key elements that could enable successful implementation. Research demonstrating VR's effectiveness emerged as a leading facilitator, along with improved knowledge about VR capabilities and the development of user-friendly interfaces that align with client needs. Staff particularly emphasized the role of proper training and professional qualifications, with some suggesting the need for specific VR therapy credentials.

The comparison between clinicians and non-clinicians (RQ4) revealed remarkably similar perspectives across most aspects of VR implementation. The only difference emerged in adoption concerns, where non-clinicians expressed somewhat higher apprehension. However, with both groups showing a median score of 4 (neither agree nor disagree), the practical significance of this difference in terms of VR adoption strategies may be limited.

Notably, a majority of non-clinicians (61%) reported having direct client interaction, suggesting less rigid role separation than might be expected between clinical and non-clinical staff. It remains open whether this overlap is due to many of our participants working in smaller disability organizations and having multiple roles, but the overlap in practical experience might help explain the similar perspectives between groups on VR implementation across staff categories.

Limitations

This study has several noteworthy limitations. First, our sample size, while adequate for detecting medium-sized effects (which most of our analyses exceeded), was relatively small. The sample was also characterized by high self-reported technological proficiency, potentially over-representing tech-savvy workers within the disability service sector. Additionally, the predominance of Australian clinicians in our sample may limit generalizability to other international contexts with different disability service frameworks and regulations.

The scope of our study focused exclusively on disability support staff, excluding other key stakeholders such as neurodivergent individuals, carers, parents, and policymakers. Future research should address these limitations through larger, more demographically diverse samples, broader international representation, and inclusion of multiple stakeholder perspectives.

Conclusion

This study provides critical insights into the implementation of VR in disability support services through analysis of staff perspectives. Our findings identify key barriers such as financial and resource constraints, knowledge gaps, and ethical concerns, alongside facilitators like training, evidence-based approaches, and user-friendly designs. These insights identify specific priorities for organizations seeking to implement VR effectively.

Building on our findings, we propose five key actions:

(1) **Address Resource Constraints:** Evaluate cost-effective VR options through small-scale pilot programs, develop business cases demonstrating return on investment, and explore funding through existing assistive technology schemes and innovation grants.

(2) **Build Implementation Capacity:** Create a comprehensive training ecosystem combining formal certification programs with ongoing professional development resources. This should include practical VR application training, technical troubleshooting skills, and integration strategies for existing care practices.

(3) **Strengthen the Evidence Base:** Conduct rigorous effectiveness studies focusing on specific applications of VR in disability support contexts, including both quantitative outcomes and qualitative user experiences.

(4) **Establish Safety and Ethical Frameworks:** Develop evidence-based guidelines addressing the unique physical, sensory, and psychological needs of neurodivergent individuals using VR, with clear protocols for safe implementation.

(5) **Foster Sustainable Adoption**: Promote collaboration between researchers, technology providers, and disability support organizations to align capabilities with needs and manage expectations effectively.

These actions aim to transform VR from an emerging technology into an effective tool for disability support services. Future research should prioritize longitudinal outcome studies, expand understanding of neurodivergent user experiences, and develop implementation frameworks tailored to disability support contexts. Through addressing these identified gaps, VR can enhance the quality and accessibility of support services for neurodivergent individuals.

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Supplementary material

The supplementary material for this article can be found online.

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