**Article:**
Aldawood, A., Field, B., Rushton, S. et al. (2026) Identification of implementation strategies using the CFIR-ERIC matching tool to address barriers in mobility assistive technology provision in Saudi Arabian hospitals. Disability and Rehabilitation: Assistive Technology. ISSN: 1748-3107

https://doi.org/10.1080/17483107.2026.2699837

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Disability and Rehabilitation: Assistive Technology

ISSN: 1748-3107 (Print) 1748-3115 (Online) Journal homepage: www.tandfonline.com/journals/iidt20

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**To cite this article:** Asma Aldawood , Becky Field , Simon Rushton & Daniel Hind (23 Jul 2026): Identification of implementation strategies using the CFIR-ERIC matching tool to address barriers in mobility assistive technology provision in Saudi Arabian hospitals, Disability and Rehabilitation: Assistive Technology, DOI: 10.1080/17483107.2026.2699837

**To link to this article:** https://doi.org/10.1080/17483107.2026.2699837

DISABILITY AND REHABILITATION: ASSISTIVE TECHNOLOGY
https://doi.org/10.1080/17483107.2026.2699837

RESEARCH ARTICLE

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# Identification of implementation strategies using the CFIR-ERIC matching tool to address barriers in mobility assistive technology provision in Saudi Arabian hospitals

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## ABSTRACT

**Purpose:** Mobility-assistive technology (MAT) faces significant global implementation barriers. This study applied a Consolidated Framework for Implementation Research (CFIR) and Expert Recommendations for Implementing Change (ERIC) matching tools to identify barriers to MAT provision in Saudi Arabia and generate evidence-based implementation strategies.

**Materials and methods:** We triangulated findings from two published studies: a scoping review of barriers to MAT and a mixed-methods study of Saudi Arabian hospitals, including survey data, semi-structured interviews, and policy document analysis. Barriers were identified, mapped to the CFIR constructs, and translated into strategies using the CFIR-ERIC Matching Tool.

**Results:** Triangulation identified 14 distinct barriers across six categories mapped to 14 CFIR constructs within five domains. The CFIR-ERIC tool generated 49 implementation strategies. Planning ($n=17$, 35%) and education ($n=13$, 26%) were the predominant strategies. Top-ranked strategies included "identify and prepare champions" "conduct educational meetings", and "assess for readiness", demonstrating applicability across multiple barriers.

**Conclusion:** The application of implementation science frameworks is a useful way to identify evidence-based strategies to address barriers to MAT provision. The predominance of planning and education strategies, reflecting endorsements from implementation science experts, suggests that systematic preparation and knowledge dissemination are fundamental to improving MAT accessibility. The findings provide actionable guidance for stakeholders in Saudi Arabia and similar settings. Future research should empirically evaluate strategy effectiveness.

### ➤ IMPLICATIONS FOR REHABILITATION

- Planning and education strategies should be prioritised to address MAT provision barriers across rehabilitation settings.
- Champions must be identified and prepared within rehabilitation teams to drive MAT adoption and address organisational resistance.
- Educational meetings and materials are needed to close knowledge gaps among rehabilitation professionals regarding MAT assessment and prescription.
- Formal implementation blueprints should be developed to standardise procurement and delivery processes across rehabilitation departments.
- Collaborative partnerships between rehabilitation teams, procurement departments, and MAT suppliers are required to reduce coordination delays.

**ARTICLE HISTORY**
Received 7 April 2026
Revised 25 June 2026
Accepted 1 July 2026

**KEYWORDS**
Assistive technology; mobility; barriers; framework; implementation science

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Supplemental data for this article can be accessed online at https://doi.org/10.1080/17483107.2026.2699837.

## Introduction

Mobility-related disabilities are increasingly recognised as a global health challenge, significantly affecting people's quality of life (QoL) and imposing substantial burdens on patients, caregivers, healthcare systems, and society [1,2]. Mobility-assistive technologies (MATs), including wheelchairs, walking frames, rollators, prosthetic and orthotic devices, and related services, play a crucial role in addressing these challenges, yet their provision faces numerous barriers worldwide [3]. International frameworks recognise access to assistive products as a fundamental right and essential for health and well-being [4,5]. However, persistent barriers – including inadequate policies, resource limitations, procurement challenges, and insufficient healthcare professional training – continue to impede effective MAT provision globally [4].

Mobility limitation is an important public health and social policy concern in Saudi Arabia. National statistics indicate that mobility limitation is the most commonly reported disability [6]. Saudi Arabia has committed to improving services for persons with disabilities through national transformation initiatives, particularly Vision 2030 [7]. However, existing evidence suggests a significant unmet need for MAT services and persistent gaps between policy and service delivery [8]. The Saudi healthcare system comprises three main sectors – the Ministry of Health as the primary provider, other government agencies (including the Ministry of Defense, National Guard, and university hospitals), and the private sector – with MAT services integrated within rehabilitation services at specialised and advanced hospitals [9]; primary care and community-level services have limited roles in MAT provision, though patients in rural areas without access to major rehabilitation centres are often required to travel to major cities for care [9]. Understanding the specific barriers in the Saudi healthcare context and identifying evidence-based strategies to address them are critical priorities.

MAT provision is a complex, multilevel health service intervention involving policies and funding arrangements, procurement and supply chains, clinical decision-making, organisational resources, and end-user engagement [4]. Implementation science offers systematic tools to understand why evidence-informed practices and services are not routinely adopted, and how to design strategies that improve uptake and sustainability [10–12]. The determinant frameworks supported the systematic identification of barriers and enablers at multiple levels [12]. The Consolidated Framework for Implementation Research (CFIR) synthesises constructs drawn from 19 implementation theories to guide the analysis of determinants within five domains: inner setting, outer setting, innovation characteristics, characteristics of individuals, and implementation process [13,14]. The Expert Recommendations for Implementing Change (ERIC) provide 73 evidence-based implementation strategies developed through a modified Delphi process with implementation science experts [15]. The CFIR-ERIC Matching Tool systematically links these frameworks by aggregating endorsements from 169 implementation science experts on which ERIC strategies are most likely to address particular CFIR constructs [16]. This systematic approach enables the development of targeted solutions to mitigate the identified barriers [16]. Recent applications have demonstrated the utility of this tool in healthcare settings, generating pragmatic strategy sets that can be tailored and prioritised for local implementation [17,18].

This study aims to identify and triangulate barriers to MAT provision across multiple data sources using the CFIR and develop implementation strategies using the CFIR–ERIC Matching Tool. Building on our previous scoping review of MAT barriers [19] and a mixed-method study in Saudi hospitals [9], this study maps barriers to CFIR constructs and proposes context-relevant strategies for strengthening MAT provisions in Saudi Arabia. These findings offer practical guidance for selecting and prioritising implementation approaches tailored to organisational needs. This is the first study to apply the CFIR-ERIC matching tool to MAT provision. A recent scoping review mapping all applications of the CFIR-ERIC tool in healthcare identified 53 studies published between 2020 and 2025 across multiple clinical areas, with no application to assistive technology provision reported [20], confirming the novelty of this work.

## Materials and methods

### *Study design*

This study applied implementation science frameworks to systematically identify strategies to address the barriers to MAT provision in Saudi Arabia. We triangulated the findings from previously published research

using the Farmer et al. protocol [21], mapped the identified barriers to CFIR constructs, and applied the CFIR-ERIC Matching Tool to generate evidence-based implementation strategies.

### *Data sources*

This study triangulated findings from two previously published studies: (1) a scoping review of barriers to MAT provision [19], and (2) a mixed-methods study of Saudi hospitals [9] that included survey data, qualitative interviews (33 stakeholders), and document analysis (six policy documents).

### *Data integration: triangulation protocol*

We used the six-step triangulation protocol developed by Farmer et al. to integrate the findings across data sources. The results and themes from each data source were organised in an Excel matrix and categorised by theme. We developed a convergence coding matrix to evaluate agreement (full agreement across all sources), partial agreement (agreement on some but not all components), dissonance (disagreement between sources), or silence (theme present in one source, absent in others) across the four data sources [21]. The convergence coding matrix was analysed to determine the overall level of agreement among the themes. A completeness assessment evaluated the unique contribution of each data source. AA conducted triangulation with a regular co-author review. The guiding research question was as follows: What factors influence the provision of MAT in Saudi Arabia?

## Identification of strategies using the CFIR-ERIC matching tool

Identified barriers were mapped to constructs within the CFIR, which comprise five domains: innovation characteristics, outer setting, inner setting, characteristics of individuals, and process [13,14]. AA mapped barriers to the CFIR constructs through regular discussion and verification by the research team. Because we used the updated CFIR framework [14], while the CFIR-ERIC Matching Tool employs earlier construct terminology, we linked the updated constructs to their corresponding earlier versions, following published guidelines [14] (Supplementary File 1).

We applied the CFIR-ERIC Matching Tool (www.cfirguide.com/eric) to identify the implementation strategies that matched the identified barriers. Users rate the relevance of each CFIR construct to their barriers (0 = not relevant, 1 = relevant), and the tool generates an output table showing the matched ERIC strategies with expert endorsement percentages [16]. We analysed the tool's output to identify (1) strategies recommended for each specific barrier category and (2) strategies applicable to multiple barrier categories simultaneously, as these may offer efficient approaches to simultaneously address several implementation challenges.

## Results

### *Barriers to MAT provision: triangulation of findings*

The triangulation of findings from four data sources – a scoping review of barriers to MAT provision, a cross-sectional survey of three Saudi hospitals, semi-structured interviews with 33 stakeholders, and an analysis of six policy documents – identified barriers across 14 CFIR constructs within five domains (Figure 1). The convergence analysis demonstrated that 100% of the identified themes showed either full agreement (50%, $n = 7$ themes) or partial agreement (50%, $n = 7$ themes) across the data sources, with no dissonance observed. Completeness assessment revealed that each data source contributed unique perspectives: the scoping review provided global context and international evidence on MAT barriers, the survey quantified service variations and resource availability across hospitals, interviews offered in-depth stakeholder perspectives on implementation challenges and organisational contexts, and documents provided formal policy frameworks and regulatory structures governing MAT provision.

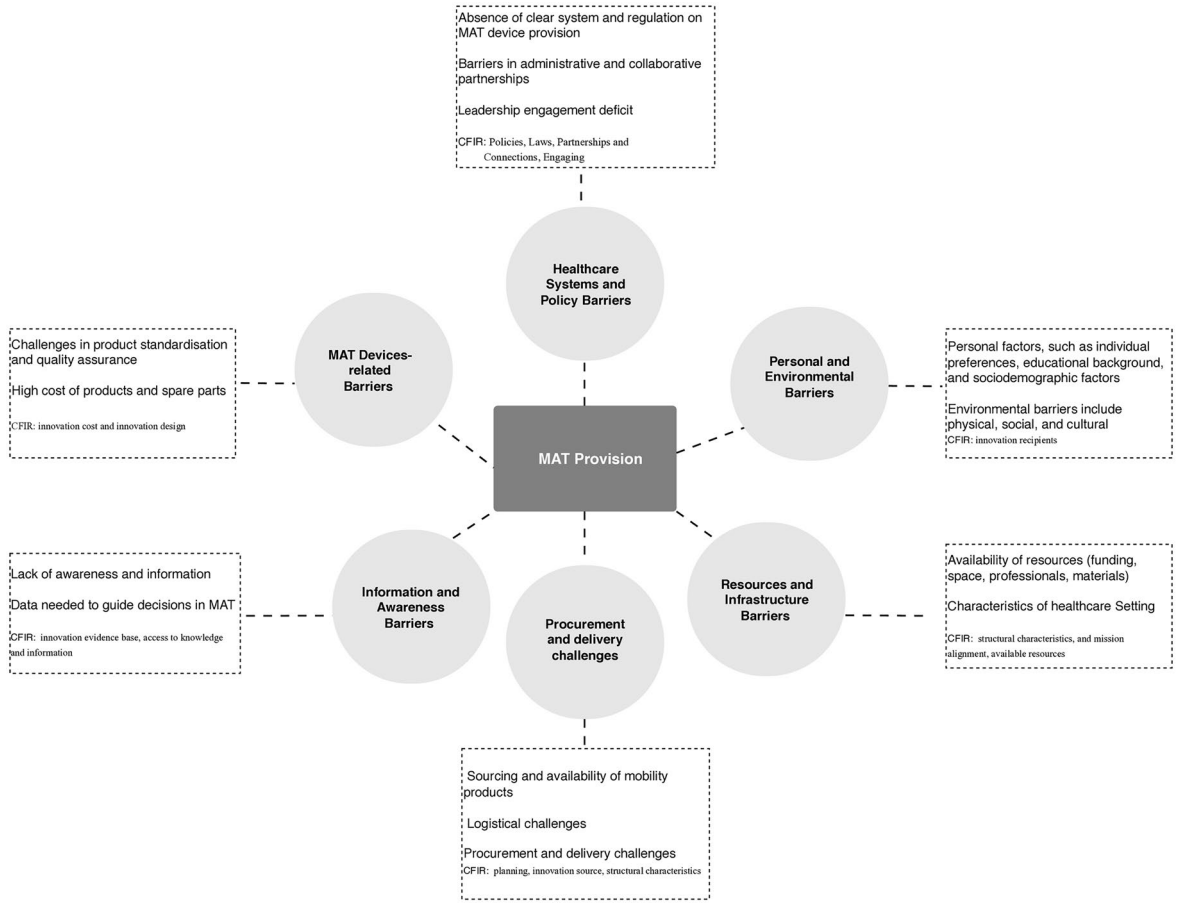


**Figure 1.** Barriers to mobility-assistive technology (MAT) provision in Saudi Arabia: triangulation of findings and associated consolidated framework for implementation research (CFIR).

The identified barriers were divided into six main categories: (1) Healthcare Systems and Policy Barriers, (2) Procurement and Delivery Challenges, (3) MAT Device-Related Barriers, (4) Information and Awareness Barriers, (5) Resources and Infrastructure Barriers, and (6) Personal and Environmental Barriers (Table 1). Details of the triangulation are available in Supplementary File 2.

Healthcare systems and policy barriers included limited government engagement, insufficient partnerships between healthcare facilities and MAT suppliers, and the absence of clear regulations governing MAT provision. Procurement and delivery challenges include planning deficiencies in forecasting device needs, complex governmental procurement processes that cause delays, and logistical barriers such as unclear distribution channels and role ambiguity. MAT device-related barriers were high cost, limited accessibility, restricted device variety owing to limited local manufacturing, and quality concerns that affect device sustainability.

Information and awareness barriers reflected insufficient data systems for inventory tracking and decision-making, limited awareness among healthcare professionals regarding available MAT options, and inadequate patient education regarding device selection and use. Resource and Infrastructure Barriers included funding constraints, staff shortages, particularly in specialised MAT assessment, inadequate clinical space for device trials, and a lack of assessment tools. Personal and environmental barriers involve individual patient factors, such as health conditions and preferences; sociodemographic characteristics affecting device acceptance; and broader environmental contexts, including transportation difficulties, geographical distances to services, and cultural factors influencing device use.

### *Implementation strategies*

Application of the CFIR-ERIC Matching Tool identified 49 implementation strategies to address the identified barriers. These strategies were categorised into five groups using Powell et al.'s [22]

**Table 1.** Summary of triangulated barriers to mobility-assistive technology (MAT) provision in Saudi Arabia and CFIR mapping.

| Category | Barrier/factor | CFIR domain/construct(s) | Evidence sources | Convergence | Key synthesis |
|---|---|---|---|---|---|
| Health system and policy | Barriers in administrative and collaborative partnerships | Outer setting domain, partnerships, and connections. | SR, Interviews, Docs | Partial agreement | The semi-structured interviews complement the findings from the scoping review and documents by providing detailed examples of how these partnership challenges manifest in practice. |
| | Absence of a clear system and regulation on the MAT device provision | Outer setting domain, policies, and laws. | SR, Survey, Interviews, Docs | Agreement | The survey results complement the observations made in the scoping review and the semi-structured interviews about regulatory ambiguity and the absence of clear guidelines |
| | Leadership engagement deficit | Process domain, engaging. | SR, Interviews | Partial agreement | Challenges of insufficient engagement and recognition from leadership. |
| Procurement and delivery | Sourcing and availability of MAT devices | Innovation domain, innovation source. | SR, Interviews | Partial agreement | Challenges related to the trustworthiness and accessibility of MAT device vendors and suppliers. |
| | Procurement and delivery challenges | Innovation domain, complexity; process domain, planning. | SR, Interviews, Docs | Partial agreement | Procurement and delivery challenges from multiple angles, such as accessibility issues, regulatory frameworks, and planning challenges. |
| | Logistical challenges | Inner setting domain, structural characteristics. | Interviews, Docs | Partial agreement | The semi-structured interviews and document analysis provide complementary insights into these challenges. |
| Device-related barriers | The high cost of MAT devices and spare parts | Innovation domain, innovation cost. | SR, Survey, Interviews, Docs | Agreement | The high cost of MAT devices is a significant barrier to the provision of MAT. |
| | Challenges in MAT device standardisation and quality assurance | Innovation domain, innovation design. | SR, Interviews, Docs | Partial agreement | The scoping review and semi-structured interviews highlighted quality problems. Document analysis shows that constraints on supplier-referenced specifications may drive quality problems. |
| Information and awareness | Data needed to guide decisions in MAT provision | Innovation domain, innovation evidence base. | SR, Interviews | Partial agreement | There is agreement on the need for comprehensive, context-specific data on MAT device effectiveness. |
| | Lack of awareness and information | Inner setting domain, access to knowledge and information. | SR, Survey, Interviews | Agreement | The findings from three sources complement each other by providing a fuller picture of the issue from different angles. |
| Resources and infrastructure | Characteristics of a healthcare setting | Inner setting domain, structural characteristics, and mission alignment. | SR, Survey, Interviews, Docs | Agreement | All sources acknowledge issues with the physical infrastructure in healthcare settings that affect the provision of MAT. |
| | Availability of resources, such as funding, space, trained professionals, and materials | Inner setting domain, available resources. | SR, Interviews, Docs | Agreement | Agreement across different sources acknowledges the challenge of resource availability. |
| Personal and environmental | Environmental barriers include physical, social, and cultural | Individuals' domain and outer setting domain, innovation recipients, policies, and laws. | SR, Survey, Interviews, Docs | Agreement | Environmental barriers significantly impact the accessibility and use of MAT. |
| | Personal factors, such as individual preferences and educational background, and sociodemographic factors | Characteristics of individuals, innovation recipients. | SR, Interviews, Docs | Agreement | Personal factors significantly impact the use and accessibility of MAT. |

CFIR, Consolidated Framework for Implementation Research; MAT, mobility-assistive technology; SR, scoping review; Docs, documents.

**Table 2.** Top 15 implementation strategies by cumulative expert endorsement.

| Rank | ERIC strategy | Cumulative endorsement | Strategy category | CFIR constructs addressed | Highest endorsement (Level 1 or Level 2)** |
|---|---|---|---|---|---|
| 1 | Identify and prepare champions | 332% | Planning | 14/14 | 63% (Engaging) |
| 2 | Conduct educational meetings | 291% | Education | 13/14 | 79% (Access to knowledge) |
| 3 | Assess for readiness and identify barriers/facilitators | 272% | Planning | 14/14 | 42% (Planning) |
| 4 | Conduct local consensus discussions | 270% | Planning | 13/14 | 42% (Engaging) |
| 5 | Capture and share local knowledge | 268% | Planning | 14/14 | 31% (Access to knowledge) |
| 6 | Create a learning collaborative | 246% | Planning | 13/14 | 45% (Access to knowledge) |
| 7 | Develop a formal implementation blueprint | 242% | Planning | 12/14 | 73% (Planning) |
| 8 | Build a coalition | 242% | Planning | 12/14 | 62% (Partnerships/ connections) |
| 9 | Inform local opinion leaders | 214% | Education | 12/14 | 38% (innovation evidence base) |
| 10 | Promote adaptability | 212% | Quality Management | 11/14 | 48% (innovation design) |
| 11 | Conduct local needs assessment | 211% | Planning | 13/14 | 57% (Innovation recipients) |
| 12 | Access new funding | 191% | Finance | 11/14 | 78% (Available resources) |
| 13 | Use advisory boards | 190% | Planning | 11/14 | 35% (partnerships and connections) |
| 14 | Develop educational materials | 187% | Education | 12/14 | 59% (Access to knowledge) |
| 15 | Alter incentive structures | 187% | Finance | 11/14 | 44% (cost) |

**Highest endorsement indicates the CFIR construct for which this strategy received the strongest expert recommendation. Level 1 = ≥50% endorsement; Level 2 = 20–49% endorsement (construct shown in parentheses).

taxonomy: planning strategies ($n = 17$, 35%), education strategies ($n = 13$, 26%), finance strategies ($n = 4$, 8%), quality management strategies ($n = 14$, 29%), and restructuring strategies ($n = 1$, 2%). The tool generated both Level 1 strategies (endorsed by ≥50% of implementation science experts for addressing specific CFIR constructs) and Level 2 strategies (endorsed by 20–49% of experts). Table 2 presents the top 15 strategies ranked by cumulative expert endorsements. See Supplementary File 3 for a complete list of all strategies, with Level 1 and Level 2 endorsements for each CFIR construct.

### *Cross-cutting implementation strategies*

Cross-cutting strategies that are simultaneously applicable to multiple barrier categories have emerged as particularly valuable for comprehensive implementation planning. The strategy "Identify and prepare champions" received the highest cumulative endorsement (332%), demonstrating relevance across all 14 identified CFIR constructs. This strategy received Level 1 endorsements, specifically for the engaging construct (63%). "Conduct educational meetings" (291% cumulative endorsement) was the second-highest endorsed strategy, achieving Level 1 status for addressing Information and Awareness Barriers (79% endorsement for Access to Knowledge construct). "Assess for readiness and identify barriers and facilitators" (272%) ranked third, with Level 1 endorsement for addressing both Procurement and Delivery Challenges (42% for Planning construct) and Resources and Infrastructure Barriers (42% for Structural Characteristics).

Additional highly endorsed cross-cutting strategies included "Conduct local consensus discussions" (270%), "Capture and share local knowledge" (268%), and "Create a learning collaborative" (246%). The predominance of planning and education strategies among the top recommendations suggests that expert consensus prioritises systematic planning and knowledge dissemination to address barriers to MAT provision. Several barrier-specific Level 1 strategies were also identified: "Access new funding" (78% endorsement) specifically for Resources and Infrastructure Barriers, "Build a coalition" (62%) for Healthcare Systems and Policy Barriers, and "Develop a formal implementation blueprint" (73%) for Procurement and Delivery Challenges related to the Planning construct. Table 3 presents the complete matrix of expert endorsements for the top 15 strategies across all the identified CFIR constructs. See Supplementary File 4 for barrier-specific strategy recommendations.

**Table 3.** Expert recommendations for 15 implementing change (ERIC) strategies to improve the provision of mobility-assistive technology, including cumulative percentages and level-1 strategies for each consolidated framework for implementation research construct.

| ERIC strategies | Cumulative percent | Innovation source | Innovation evidence base | Complexity | Innovation design | Cost | Innovation recipients | Partnerships and connections | Policies, laws | Structural characteristics | Mission alignment | Available resources | Access to knowledge and information | Planning | Engaging |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Top strategies based on cumulative percent to address more than one barrier identified | | | | | | | | | | | | | | | |
| Identify and prepare champions | 332% | 31%* | 41%* | 30%* | 15% | 12% | 5% | 15% | 22%* | 27%* | 12% | 4% | 24%* | 31%* | 63%† |
| Conduct educational meetings | 291% | 27%* | 47%* | 13% | 22%* | 12% | 10% | 12% | 15% | 5% | 21%* | 0% | 79%† | 8% | 21%* |
| Assess for readiness and identify barriers and facilitators | 272% | 12% | 13% | 30%* | 7% | 16% | 33%* | 15% | 4% | 36%* | 6% | 13% | 7% | 42%* | 38%* |
| Conduct local consensus discussions | 270% | 19% | 41%* | 7% | 26%* | 4% | 29%* | 15% | 22%* | 14% | 18% | 0% | 10% | 23%* | 42%* |
| Capture and share local knowledge | 268% | 23%* | 25%* | 27%* | 15% | 4% | 10% | 23%* | 26%* | 23%* | 12% | 22%* | 31%* | 15% | 13% |
| Create a learning collaborative | 246% | 12% | 16% | 33%* | 7% | 8% | 0% | 31%* | 15% | 18% | 12% | 9% | 45%* | 8% | 33%* |
| Develop a formal implementation blueprint | 242% | 0% | 0% | 43%* | 15% | 8% | 5% | 4% | 7% | 18% | 42%* | 4% | 14% | 73%† | 8% |
| Build a coalition | 242% | 31%* | 6% | 0% | 0% | 4% | 14% | 62%† | 33%* | 27%* | 15% | 17% | 3% | 4% | 25%* |
| Inform local opinion leaders | 214% | 27%* | 38%* | 13% | 19% | 12% | 0% | 15% | 22%* | 14% | 18% | 0% | 7% | 0% | 29%* |
| Promote adaptability | 212% | 31%* | 3% | 40%* | 48%* | 16% | 14% | 0% | 0% | 23%* | 9% | 4% | 7% | 0% | 17% |
| Conduct local needs assessment | 211% | 12% | 3% | 3% | 15% | 4% | 57%† | 12% | 7% | 18%* | 6% | 0% | 3% | 50%† | 21%* |
| Access new funding | 191% | 0% | 3% | 3% | 4% | 72%† | 0% | 4% | 7% | 5% | 3% | 78%† | 0% | 8% | 4% |
| Use advisory boards | 190% | 23%* | 9% | 0% | 19% | 0% | 29%* | 35%* | 15% | 5% | 12% | 4% | 0% | 15% | 25%* |
| Develop educational materials | 187% | 12% | 28%* | 13%* | 33% | 0% | 10% | 4% | 4% | 0% | 9% | 4% | 59%† | 8% | 4% |
| Alter incentive structures | 187% | 4% | 3% | 7% | 0% | 44%* | 10% | 0% | 41%* | 18% | 15% | 17% | 0% | 12% | 17% |

*Level 1 strategy (≥50% expert endorsement). †Level 2 strategy (20–49% expert endorsement).

## Discussion

This study applied the CFIR-ERIC Matching tool to identify implementation strategies to address barriers to MAT provision in Saudi Arabia. The triangulation of findings from the four data sources revealed 14 distinct barriers across six categories: healthcare systems and policy barriers, procurement and delivery challenges, device-related barriers, information and awareness barriers, resource and infrastructure barriers, and personal and environmental barriers, mapped to 14 CFIR constructs within five domains. The application of the tool yielded 49 ERIC strategies applicable to these barriers, with planning ($n = 17$, 35%) and education ($n = 13$, 26%) strategies receiving the highest level of expert endorsement. The predominance of these strategy types suggests that systematic planning and knowledge dissemination are foundations for improving MAT accessibility in resource-constrained healthcare systems.

The identified barriers align with international evidence of systemic challenges in assistive technology provision. Healthcare system barriers – inadequate regulations, limited leadership, and poor coordination between facilities and suppliers – parallel findings from South Africa, where public systems met only 25–65% of needs [23], and Canada, where 26% of persons with disabilities experienced unmet needs due to uncoordinated systems [24]. These findings are consistent with previous work identifying resource and infrastructure and economic, personal, sociocultural, and information barriers as universal challenges in MAT access [4,25,26]. Operational- and device-related challenges, including procurement complexities, high costs, and quality concerns, reflect broader issues in resource-constrained settings [27,28]. Information deficits among healthcare professionals and inadequate data for decision-making complicate these challenges, consistent with WHO [4] findings on insufficient global MAT knowledge. Resource constraints – funding, infrastructure, and personnel shortages – further limit the service capacity [4,26]. Personal factors and environmental contexts – including individual preferences, sociocultural factors, and physical environmental constraints – significantly influence MAT acceptance, findings that align with the Matching Person and Technology (MPT) Model, which highlights that successful AT outcomes require alignment between the technology, the user's preferences, and the environment of use [29]. When this alignment is not achieved, technology non-use and abandonment are likely outcomes [29], reinforcing the need for person-centred approaches to MAT provision in Saudi Arabia.

Among matched strategies, "identify and prepare champions" received the highest cumulative expert endorsement (332%), addressing multiple barriers across inner setting, innovation, process, and outer setting domains. This strategy achieved Level 1 endorsement of engagement barriers (63%) and targeted sourcing challenges, leadership deficits, and procurement complexities. Champions communicate innovation values, facilitate acceptance, address organisational resistance [15], and foster continuous improvement cultures [13]. This strategy demonstrated a median improvement of 12% in compliance with the clinical practice [30]. "Conduct educational meetings" (291% cumulative endorsement) achieved Level 1 status for information and awareness barriers (79% endorsement). Given the deficits identified in MAT knowledge, organising targeted stakeholder meetings can enhance knowledge dissemination through workshops for healthcare professionals, seminars for managers on cost-effectiveness, and community outreach to address cultural stigma. This emphasis on education aligns with Greenhalgh et al.'s finding that knowledge dissemination is critical for innovation diffusion in healthcare organisations, with a 6% effect size on care outcomes [30,31]. "Assess for readiness and identify barriers" (272%) and "conduct local consensus discussions" (270%) demonstrated broad applicability as level 2 strategies across multiple CFIR constructs, suggesting the potential for significant impact through multi-barrier approaches [16]. Several matched strategies, engaging champions, delivering educational materials, and conducting educational meetings, have demonstrated effect sizes of 12%, 2%, and 6%, respectively, in clinical practice [30], thereby providing evidence-based guidance for stakeholders [16].

This study's methodological triangulation of multiple data sources and diverse stakeholder perspectives enhanced the trustworthiness of the CFIR-ERIC mapping. Application of the matching tool to MAT provisions provides foundational guidance for implementation planning tailored to the Saudi healthcare context. However, this study has several limitations that warrant consideration. The CFIR-ERIC tool relies on expert consensus, predominantly from Western countries (the USA, Canada, and Australia), potentially limiting its generalisability to non-Western contexts [16]. While Yakovchenko et al. demonstrated that 66% of ERIC strategies (48 of 73) showed positive associations with implementation outcomes in a

comprehensive five-year evaluation [32], these strategies have not been specifically validated for MAT provision in Saudi Arabia. Empirical testing within the Saudi healthcare system is necessary before wide-scale implementation. A further limitation is that the contextualisation of ERIC strategies was undertaken without collaborative input from diverse stakeholders. Whilst the CFIR-ERIC matching tool provided evidence-based recommendations, adapting these strategies to the Saudi context would benefit from co-design and co-production with individuals with lived experience of mobility disabilities, healthcare professionals, managers, policymakers, MAT suppliers, and representatives from relevant government bodies. Future research should therefore employ participatory approaches, such as the Delphi method, to engage stakeholders in strategy contextualisation, ensuring that implementation strategies are feasible, acceptable, and aligned with local needs and priorities.

These findings provide a foundation for developing implementation plans to enhance MAT provision, aligned with the supportive environment of Saudi Vision 2030 [7]. Stakeholders of the Ministry of Health, including leaders, managers, healthcare professionals, and policymakers, can use evidence-based strategies for decision-making and intervention design [16]. Beyond Saudi Arabia, these findings offer a transferable framework for other countries facing similar MAT accessibility challenges, particularly in the Middle East, low- and middle-income countries, where implementation science evidence remains scarce. Healthcare professionals trained through the programs of the Saudi Commission for Health Specialties are positioned to champion strategy adoption, adapting approaches to specific contexts and engaging patients in understanding the challenges affecting MAT adoption. Developing culturally appropriate educational materials can enhance the understanding and ensure equitable access across populations. Therefore, policy-makers should use evidence-based strategies to plan effective interventions. Future research should focus on selecting, tailoring, and testing strategies within specific Saudi contexts to evaluate their effectiveness across settings and refine the approaches over time. Supplementary Table 5 provides context-specific guidance for implementing each strategy within Saudi Arabia's healthcare system, including suggested implementation organisations and practical implications for MAT provision.

## Conclusion

This study provides a comprehensive overview of the challenges in MAT provision, including issues related to healthcare systems and policy barriers, procurement and delivery challenges, MAT device-related barriers, information and awareness barriers, resource and infrastructure barriers, and personal and environmental barriers. Mapping these barriers to ERIC strategies revealed that the most endorsed strategies were identifying and preparing champions, conducting educational meetings, assessing readiness, identifying barriers and facilitators, and conducting local consensus discussions. The strategies identified in this study provide a foundation for future research to develop implementation plans to enhance MAT provision in Saudi Arabia. Future research should conduct empirical evaluations to assess the impact of these strategies, employing co-design and co-production approaches with diverse stakeholders – including individuals with lived experience of mobility disabilities, healthcare professionals, policymakers, and MAT suppliers to ensure that implementation strategies are contextually appropriate, feasible, and acceptable.

## Acknowledgments

The authors thank the University of Sheffield and King Saud bin Abdulaziz University for Health Sciences (KSAU-HS) for their support.

## Author contributions

CRediT: **Asma Aldawood**: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Visualization, Writing – original draft, Writing – review & editing; **Becky Field**: Conceptualization, Methodology, Resources, Supervision, Validation, Writing – review & editing; **Simon Rushton**: Methodology, Supervision, Validation, Writing – review & editing; **Daniel Hind**: Conceptualization, Methodology, Supervision, Validation, Writing – review & editing.

## Disclosure statement

No potential conflict of interest was reported by the author(s).

## Funding

This research was conducted as part of a doctoral study funded by the King Saud Bin Abdulaziz University for Health Sciences (KSAU-HS). No additional grants were received for this study from funding agencies in the public, commercial, or not-for-profit sectors.

## Notes on contributors

***Asma Aldawood*** is an Assistant Professor in the Occupational Therapy Department at King Saud bin Abdulaziz University for Health Sciences, Riyadh, Saudi Arabia. As a Saudi Arabian occupational therapist with clinical and research experience in MAT provision within the Saudi public healthcare system, she brings insider knowledge of the contextual, cultural, and systemic factors shaping rehabilitation services in Saudi Arabia.

***Becky Field*** is a qualitative health services researcher at the School of Medicine and Population Health, University of Sheffield, UK, with expertise in complex intervention development and qualitative methods. She provided an external methodological perspective throughout the research process.

***Simon Rushton*** is a Professor of International Politics at the University of Sheffield, UK, with research interests in global health governance and health security. He contributed an external perspective on policy and governance dimensions of MAT provision.

***Daniel Hind*** is a Senior Research Fellow at the School of Healthcare, University of Leeds, UK, specialising in mixed-methods research and clinical trials. He provided external expertise in mixed-methods research design and implementation science methodology.

## Data availability statement

All analysed data supporting the findings are included in the article and supplementary materials.

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